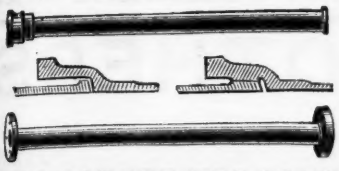
# THE JOURNAL OF GAS LIGHTING
## WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXVIII. No. 1750.] LONDON, NOVEMBER 24, 1896. [48TH YEAR. PRICE 6d.



GAS AND WATER PIPES
1½ to 12 IN. BORE.



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**LANEMARK CANNEL AND GAS COALS.**
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Shipping Ports: All the principal Scotch Ports.

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Parker's Imperial Black Varnish,
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ALDWARKE MAIN, CAR HOUSE & ROTHERHAM MAIN COLLIERIES, NEAR ROTHERHAM.
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Analysis: 12,600 Feet of 19-Candle Gas per Ton.
Value in Pounds of Sperm, 820·80.
VERY FREE FROM IMPURITIES.
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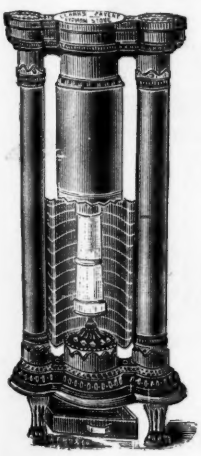

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**"SYPHON" STOVES**
FOR USE WITHOUT A FLUE.
NO FLUE REQUIRED. NO SMOKE. NO SMELL.
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The "SYPHON" Stove produces A PURE, EQUABLE, AND AGREEABLE HEAT, which can be graduated or sustained at the will of the user.
The most economical and convenient Heating Apparatus for all classes of Dwellings, and eminently suited for ENTRANCE HALLS, BEDROOMS, CONSERVATORIES, SHOPS, OFFICES, GALLERIES, CONCERT ROOMS, VESTRIES, &c., &c.
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Noted for Strength and Simplicity of Construction.

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Material and Workmanship of the best.

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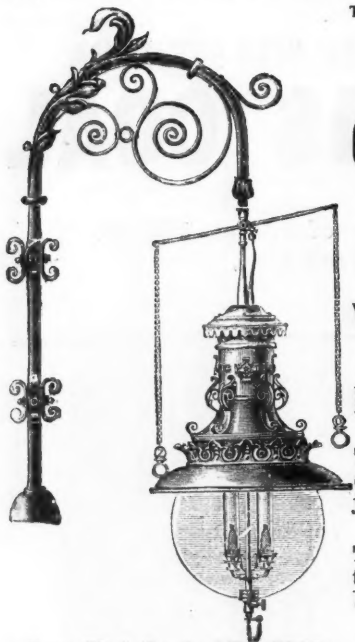

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**(PROTECTED BY ROYAL LETTERS PATENT)**

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## Incandescent System of Gas Lighting.

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**Made for One, Two, Three, and Five Lights.**

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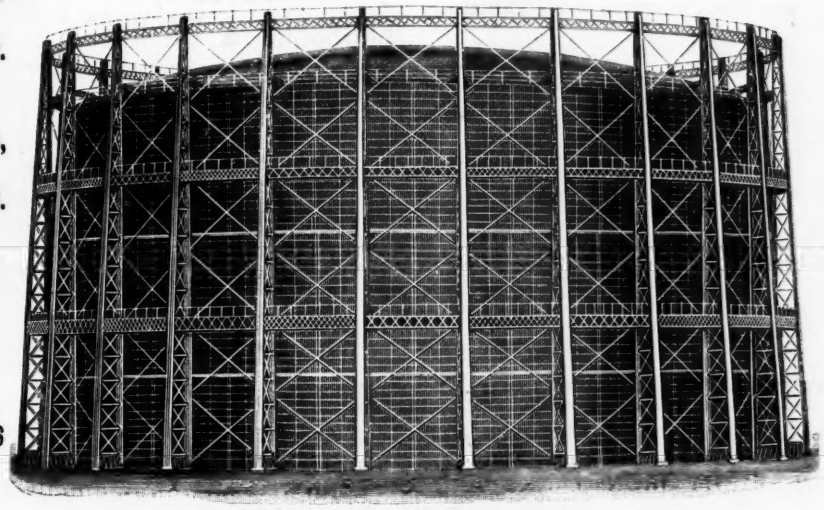

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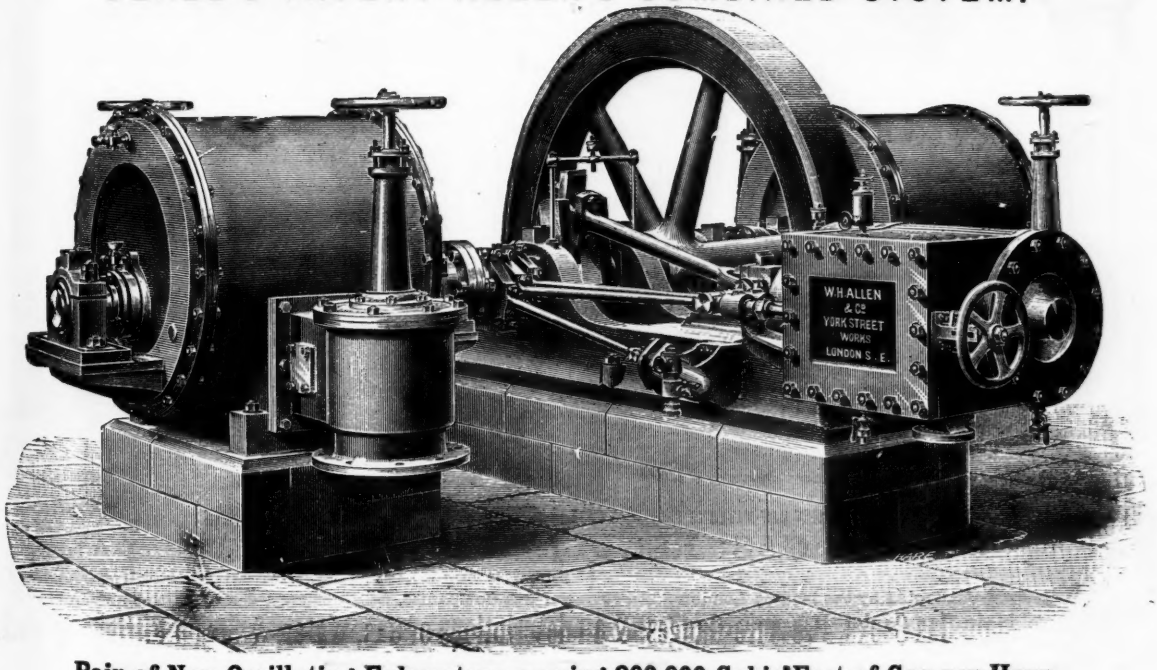


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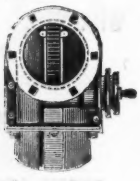

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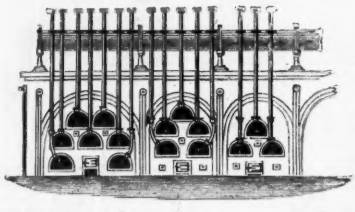

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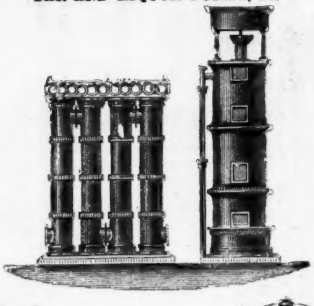

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for working Purifiers,
Also Bye-Pass & Stop Valves.

PURIFIERS with Planed Joints,
HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS, and SPECIALS.
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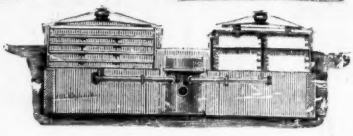

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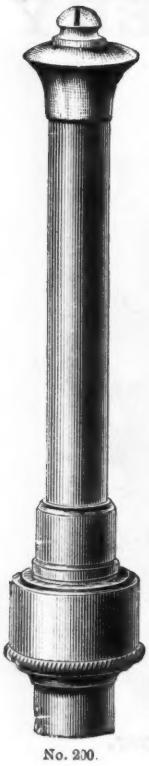
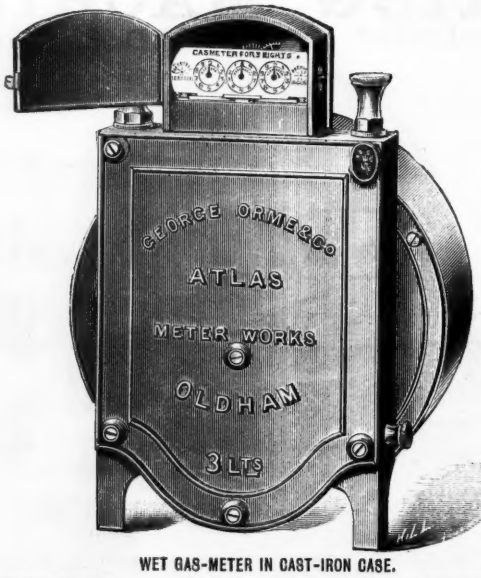
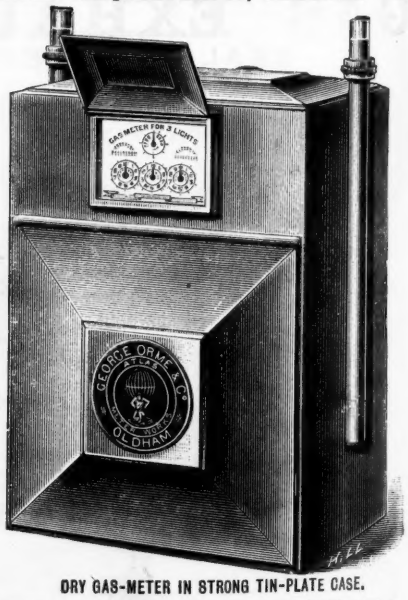


No. 200.




WET GAS-METER IN CAST-IRON CASE.




DRY GAS-METER IN STRONG TIN-PLATE CASE.

ORME'S GAS REGULATOR FOR STREET LAMPS.
AS ILLUSTRATION NO. 200.
Adopted by the leading London and Provincial Gas Companies. More than 150,000 now in use.
Main Gas Cocks, Pressure-Gauges, & all descriptions of Gas, Water, & Steam Fittings in stock.

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Pronounced by Mr. Justice Wills, and confirmed by the Court of Appeal, to be

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FURTHER DEVELOPMENTS; ENORMOUS ECONOMY;
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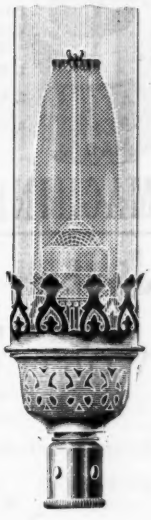

**THE NEW "GEM" BURNER, 5s. 6d.**
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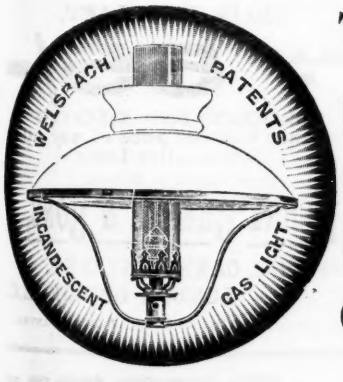
35-Candle Power from $1\frac{3}{4}$ Cubic Feet of Gas!!!

THE "GEM" BURNER IS SPECIALLY SUITABLE FOR DOMESTIC LIGHTING.
GREATLY IMPROVED DISTRIBUTION OF LIGHT.

It is the Brightest "Gem."
20 Candles per Cubic Foot of Gas!!!




The WELSBACH INCANDESCENT GAS-LIGHT is the

MOST ECONOMICAL
MOST BRILLIANT
MOST HEALTHY
CLEANEST GAS

} LIGHT

**THE "GEM" BURNER, 5s. 6d.**
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WHICH HAS BEEN FITTED TO MANY OF THE LARGEST GASHOLDERS IN LONDON AND THE PROVINCES, AND IN AUSTRIA, GERMANY, DENMARK, AND THE UNITED STATES.

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WORTLEY FIRE-CLAY WORKS,
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Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing adhesion of Carbon.
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PATENT

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Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

**Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.**

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## JENA CHIMNEYS.

We offer the well-known Chimneys manufactured by **Messrs. SCHOTT & GEN:, JENA,** at **56/6 per gross,** in original cases containing 3¾ gross.

Delivered free to any Railway Station in England. *Terms Cash.*

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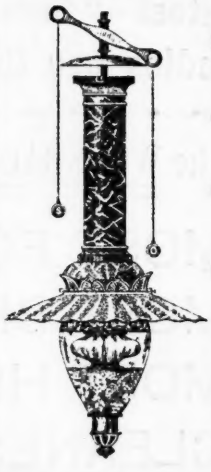
## The Climax of Regenerative Gas Lighting!!



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## "VERTMARCHE"
**A 280-CANDLE POWER PLAIN IRON LAMP,**
**CLASS A— 55/-**
**LIGHT for LIGHT**
less than half the price of any other Regenerative Lamp.
Manufactured in England.

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Manufacture & supply best quality of

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Special Bricks & Blocks for GENERATOR & REGENERATOR FURNACES.
FIRE BRICKS, LUMPS, & TILES, BLUE STAFFORDSHIRE VITRIFIED BRICKS FOR PAVING, &c., &c.
*EVERY REQUISITE FOR GAS-WORKS. Retort Setters sent to any part of the Kingdom.*
Contractors for the erection of Retort-Benches complete.

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Interior of Retort-House at the Bradford Road Gas-Works, Manchester, showing the Compressed-Air Drawing and Charging Machines.

# WEST'S GAS IMPROVEMENT COMPANY, LTD.,

## ALBION IRON-WORKS, MILES PLATTING, MANCHESTER.

AND

**104, Queen Victoria St.,**

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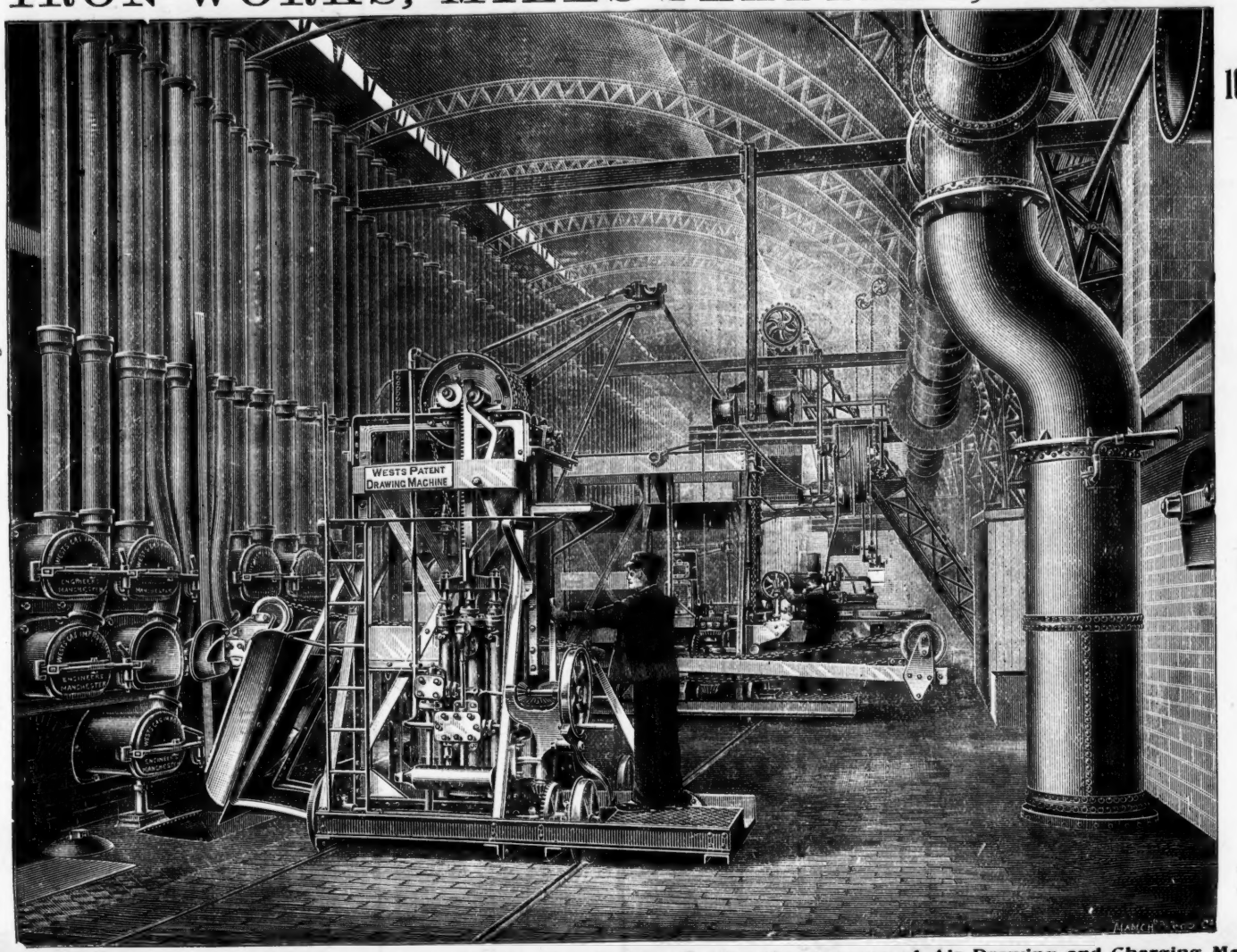
**WEST'S MANUAL AND POWER MACHINERY FOR CHARGING AND DRAWING GAS-RETORTS.**




Interior of Retort-House at the Bradford Road Gas-Works, Manchester, showing the Compressed-Air Drawing and Charging Machines.

AND

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OVER

**560,000**

**LINEAL FEET**

OF

**RETORTS DAILY**

ARE CHARGED AND DRAWN BY

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# KIRKHAM, HULETT, & CHANDLER, LD.

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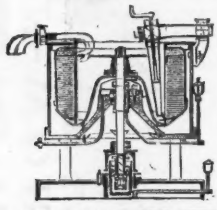
MARSHALL'S PATENT COMBINED BATTERY CONDENSER AND SCRUBBER.

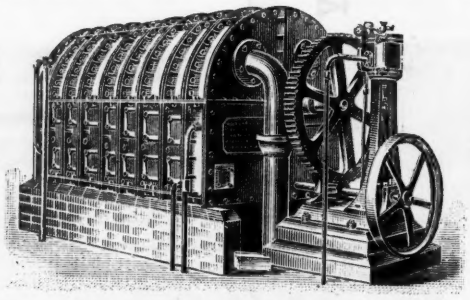
Extract from letter from Mr. Winstanley, of Coventry: 'The Condensers you erected for us have been in use some time, and are working very satisfactorily.'

BURMEISTER AND WAIN'S TAR-SEPARATOR.



EXTRACTS OVER 99 PER CENT. OF AMMONIACAL LIQUOR FROM TAR.

## PATENT "STANDARD" WASHER-SCRUBBER.

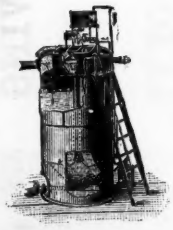


OVER 530 MACHINES

*In use and in course of Construction.*

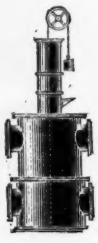
They extract all the Ammonia and a large proportion of Carbonic Acid and Sulphuretted Hydrogen.

BRUUN'S PATENT WATER SOFTENER



PREVENTS ALL "SCALE" AND SAVES FUEL.

MARSHALL'S PATENT TAR EXTRACTOR AND WASHER.



Extract from letter from the Late Mr. Jabez Church: "The Marshall Patent Tar-Extractor has given very satisfactory results."

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**COAL-BREAKERS. COKE-SCREENS.**

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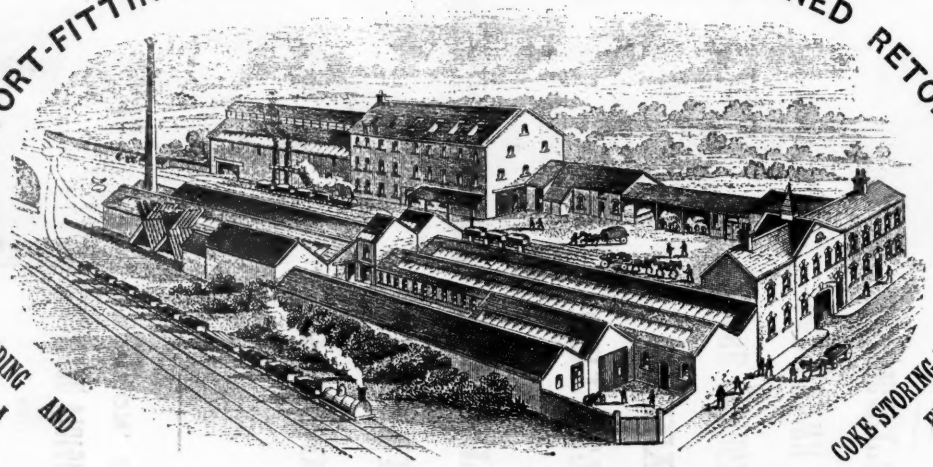
RETORT-FITTINGS, REGENERATOR SETTINGS, INCLINED RETORTS.



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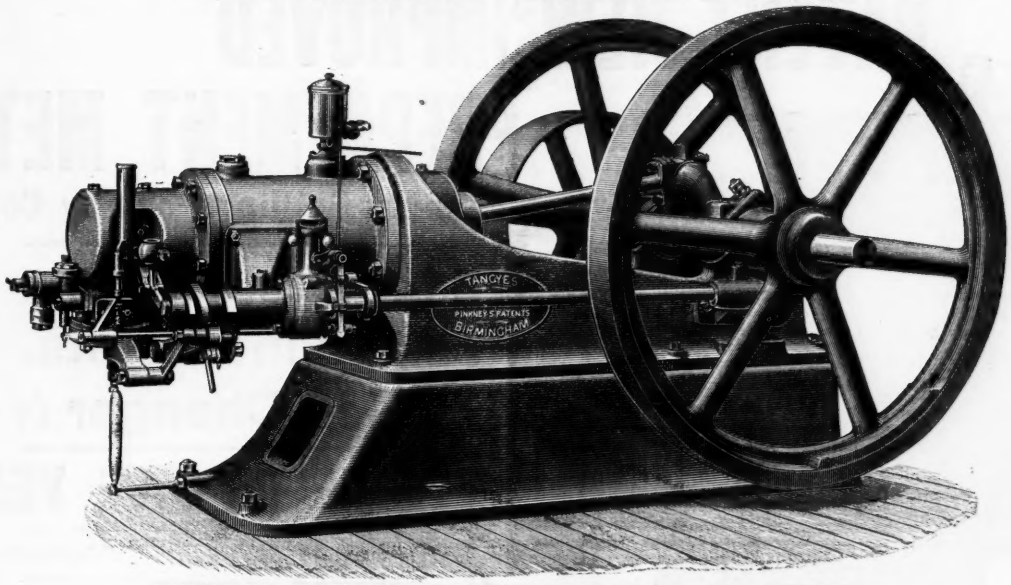
BEEHIVE WORKS, **RETFORD,** NOTTS.

# TANGYES GAS-ENGINE

"OTTO" PRINCIPLE. PINKNEY'S PATENTS.




THE 12-HORSE POWER (NOM.) ENGINE.

ENGINES OF ALL SIZES.

## TANGYES LIMITED, BIRMINGHAM;

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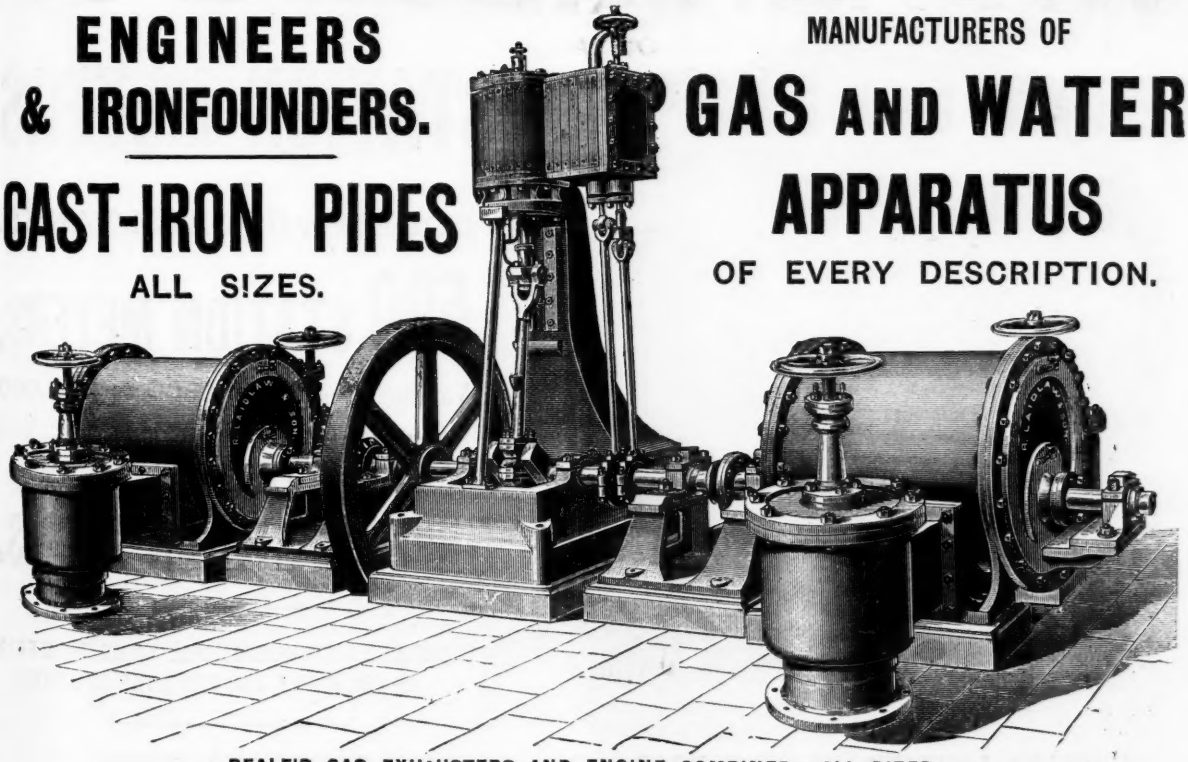

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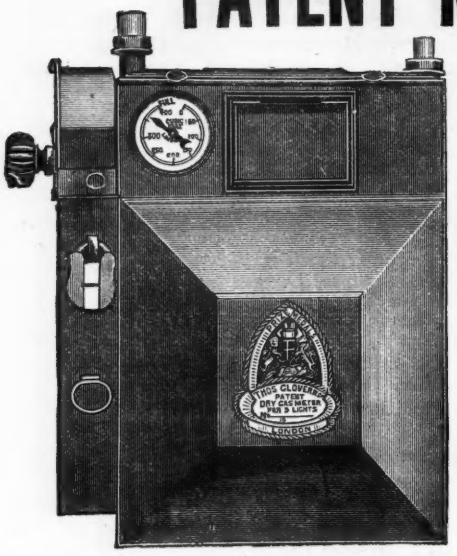

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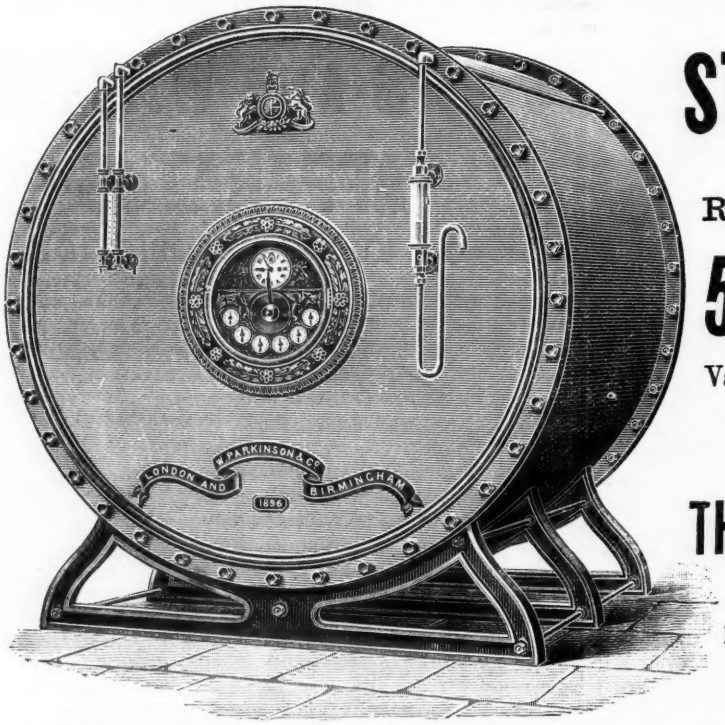


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## TO CORRESPONDENTS.

*No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.*

## EDITORIAL NOTES.

### Trade Union Deputations to Ministers.

THE lucky members of the Parliamentary Committee of the Trade Union Congress, and other followers of the agitator's pleasantly varied calling, have had a week in town, which it is to be hoped they thoroughly enjoyed. It must be a welcome change from the mine and the workshop to find oneself in a position to attend Trade Union Congresses, International Conventions, and similar diverting gatherings, at other people's expense. Those who follow this way of life have a happy knack of making one outing the occasion for another. They get sent as delegates to a Congress, and there they vote themselves all manner of interesting trips, including the customary deputations to Her Majesty's Ministers for the purpose of presenting the resolutions passed. The next proceeding, we suppose, will be to call a meeting somewhere to receive the reports upon the result of the deputations; and so the merry game goes on. Presumably, the men who pay for all this like to have it so, or they would "rise in their thousands" and make themselves disagreeable about it. Perhaps, however, like the members of the learned professions, they acquiesce in the rewards gained by their more fortunate brethren, in the hope of sharing the same good luck some day. However this may be, the deputations that have been going the round of the Government offices during the past week seem to have had a good time. They went to the Home Secretary and laid before him a curious mess of cold Socialism and indifferently warmed-up "Labourism"—to coin a word that seems to be wanted—freshened up by a little reference to the actuality of the so-called cab strike in London. As his nature prompted and his office required, the Home Secretary was very polite to his visitors; and in his address to them he picked his way through the litter of heterogenous resolutions which had been thrown, so to speak, on the office floor, with a dexterity that must have impressed, if his words failed to satisfy, his audience. In plain truth, nothing would be more disconcerting to the members of a Trade Unionist deputation than to receive an official assurance that all their demands were already inscribed in the legislative programme of the Administration, and would be gratified before the year was out. Every precaution is taken against the risk of having so summary a stop put to the business of grievance-mongering by those who cultivate it. The Home Secretary was required to deal with a number of complaints that would occupy the time of Parliament for the next twenty years, if embodied in a series of Bills. A few Bills of the kind will, however, be submitted to Parliament, and among others there is to be a Government measure for the amendment of the law of employers' liability. Of course, the Trade Unions are as vindictive as ever on this score; and the Home Secretary was also as firm as usual in refusing to break the promises he has made to the other side. The Trade Unions have taken up new ground with regard to the way of extending employers' liability, and now profess that all they want is to secure better protection for life and limb against the hazards of employment. The Home Secretary joins them in this view of what is really required; agreeing that the principal object to be put in the foreground of legislation on this subject is not the money compensation for injury, but the inducement of all concerned to adopt proper provisions for the safety of life.

In Mr. Ritchie, at the Board of Trade, the Trade Union deputation had a harder nut to crack. He heard everything that the speakers had to say, and then proceeded to set them right. He drew attention, in the first place, to the existence in all the resolutions submitted to him of the prominent element of demand for Government supervision and control. "It was rather "remarkable," said Mr. Ritchie, "that in these days of wide "franchise, of important local authorities, and of trade "organizations, there should be a growing demand, as there "was undoubtedly, for central interference in a large "number of matters." There is no interest that more frequently goes crying to the Government for help to get its own ends than Trade Unionism; and how the Trade Unionists would complain if employers did the same thing! As a commentator on this observation of Mr. Ritchie's puts it: "There is a great and ever-growing demand for

"Government interference with every social and commercial arrangement. Wherever any group of workmen fail to get things quite their own way, they demand legislation to coerce the people concerned, and inspectors to see that the legislation is carried out. Concurrently with the increasing extension of local government, there is a steady and growing demand for interference by the Central Authority, with the result that the sphere of individual effort is suffering the most serious encroachment on both sides. . . . Wherever a man turns nowadays in business or in manufacture, he is confronted by an inspector, a policeman, or a set of petty and vexatious Trade Union rules. The manliness, the self-reliance, and the personal initiative of our working classes are tending to disappear under a system of universal coddling; and their habitual tone is becoming a whine scarcely distinguishable from that of the mendicant. The strength of the Trade Unions, which, properly directed, would amply suffice to settle equitable conditions for every workman, is frittered away in futile attempts to upset the law of the market, or in childish obstruction of the trade which workmen are even more interested in promoting than in regulating. The real foes of English commercial supremacy are those of its own household. Enterprise is being steadily shackled and suffocated by hard-and-fast rules administered by a deadly routine, instead of being stimulated and directed by the intelligent co-operation of capital and labour in its autonomous development." All this is quite true; but the difficulty is to get the proper persons to see it.

### The Works Department of the London County Council.

The London County Council are in deep waters just now; and the waters are so troubled that the great John Burns has been compelled to decline a lecture engagement in Scotland in order to devote his time and his whole energies to the duty of pulling the Council through. This is only right, because it is in carrying out the "Progressive programme," framed by Mr. Burns and his coadjutors in the Council, that the trouble has been encountered. It is notorious that the Progressive ideal has been to concentrate in the hands of the Council all sorts of responsibilities which a jealous Parliament has not hitherto seen fit to entrust to it. The model Progressive, whose administrative training has usually been obtained in manipulating Trade Unions, organizing Sunday lecture arrangements, and writing newspaper and review articles, has never experienced the smallest twinge of diffidence in regard to his individual and collective ability to manage water and gas works, tramways, steamboats, the police force, and every other service required by the vast province of houses called London. In vain have successive Governments tried to persuade the perfervid apostles of this cause to attend to the duties already confided to the County Council, if only to prove to demonstration the trustworthiness of this youthful authority. The noble Progressive was not to be put off his ambition in this way; and we all know with what perseverance and ingenuity the party has carried on a campaign of aggression, with a view to conquest, against the Water Companies. In the meantime, the Council have been induced by the same party to create a Works Department, which has been conducted entirely on Progressive principles.

For some time past, however, unpleasant rumours have been flying about to the discredit of the administration of this model municipal department; and though the Progressive leaders have vehemently declared that there was nothing in these prejudicial reports except political rancour and individualist jealousy of a great and triumphal experiment in municipalization, matters came to a climax with the request of the Chairman of the Works Committee for permission to withdraw a report on the work of the department, on the ground of discovered errors in certain figures. Inquiry led to a confession by the Committee that grave inaccuracies had taken place in the bookkeeping; a practice having sprung up of falsifying the accounts relating to different jobs, in order to place the working of the department in a favourable light. Several principal officials were implicated in this reprehensible proceeding; and they have been promptly dismissed. There appears to be no reason to suppose that there has been any actual misappropriation for personal uses of the money or goods of the ratepayers; but what has been proved is bad enough. Yet the behaviour of certain members of the Council and the Works Committee in face of these revelations is even worse than the actual evils that have so early in the day beset this experiment in municipalization. These individuals—Messrs. Burns and Benn being among the noisiest of them—have continued to profess that the whole exposure, instead of being a scandal, is nothing more than a "mare's nest;" and they affect to regard it as no reflection at all upon the credit of the Works Department management for probity and business capacity. Part of the Progressive Press has taken the same attitude; declaring that all the trouble has arisen through the jealousy of members of the Council belonging to the other party, and so forth. This will not do. As "The Times" very forcibly put it, what the public would like to know is the precise nature of the inducements that originated the conspiracy of manager, foremen, bookkeepers, and inspectors which had for its end the falsification of the books. If they had been defrauding the Council, the process would have been intelligible enough; but if these misrepresentations were not meant for the personal advantage of the actual perpetrators, who instigated them, and what end were they expected to serve? Moreover, the system under which such things are possible must be open to manipulation of a less individually innocent kind. It is felt that the sacrifice of the manager and a handful of his assistants, though necessary, is by no means the last measure of purgation that will have to be carried out. The manager himself, in his final explanation to the Committee, states that his work has been complicated and enormously increased, by the regulations of the Council, beyond what would be required in an outside contractor's office. This can be easily believed. The "Labour" members of the Council have had their finger in every pie; and every Trade Union fad has been obsequiously followed by the officials. The only question at present is: How is this mess to be wiped up? Afterwards it will be time to ask whether the County Council is well advised in seeking to charge itself with industrial concerns compared with which its own Works Department is a very small affair.

### The Sale of Coke to Householders.

In our "Correspondence" column to-day will be found a pertinent and timely letter from Mr. Hanbury Thomas, of Sheffield, on the very troublesome question of how coke may be sold to advantage. There is an impression abroad among gas managers that such Gas Companies as the Sheffield United have exceptional advantages for the disposal of coke to local manufacturers. Mr. Thomas explains, however, that while plenty of fuel is required for all sorts of trade purposes in a place like Sheffield, the market is at the same time kept very well supplied from other sources besides the gas-works. He has at any rate found it worth while to take some trouble to bring the advantages of coke home to the perceptions of householders; and there is a good deal in his observations on this subject. His remark about some people preferring a little credit for their household fuel is very much to the point. This observation was illustrated by the few words let drop by Mr. T. May, of Richmond, in the course of the discussion on Mr. W. E. Price's paper at the recent Southern District meeting. Mr. May ascribed much of the "import" trade in coke, which vexes the soul of the local gas manager, to the circumstance of many householders preferring to buy of coal merchants from whom they can get credit. The reflection must occur to anyone perusing this statement, that the local Gas Company ought not to allow itself to be driven out of the market for any such simple reason as this. It is probably correct that the cast-iron "cash with order" system of many gas undertakings checks a great deal of business. People do not know how much money they ought to send to get their coke delivered to their houses direct from the gas-works, and so they do not order any at all. A greater difficulty in the way of the would-be consumer of coke for domestic purposes is the disability under which most householders labour of having no place in which they can store it. Few modern houses of moderate size have cellarage large enough to hold more than two or three tons of coal at a time; and it is usually an impossibility to keep even 5 cwt. of coke in the same place. It is quite true that broken coke answers admirably for use in kitcheners; though for this purpose it ought to be broken smaller than Mr. Hanbury Thomas's "apples"—unless he means the sort of apple known to street vendors as "golden nobs."

Still, however, there is the difficulty of keeping it in addition to coal. Whether it is coal, or coke, or wood, the tendency of householders is to simplify matters by keeping only one kind of fuel; and the one they eventually settle upon is that which lends itself most readily to the greatest number of uses. Hence coke gets neglected.

To one other point of Mr. Hanbury Thomas's letter we should like to commend our readers' particular attention—the need for pertinacity in advertising. So many people there are in the world who, having goods to sell, think they do all that is required in the matter of notifying the fact to those whom it may concern if they issue occasional advertisements, send out a few circulars at rare intervals, or make some other casual announcement to possible customers that certain commodities are to be had by those who will take the trouble to see about them. This is the wrong principle in advertising, as Mr. Hanbury Thomas rightly says. Constant reminding is what the buying public wants, or it will go without the things. There may be something unphilosophical in the whole theory of advertising; and if anybody argues that it is absurd to think that a sensible person can be induced to purchase such a commodity as coke by reason of seeing a recommendation of it whenever he receives his gas bill, it is impossible to deny the absurdity. Yet the fact remains, whatever reason may have to say with regard to it. Mr. Hanbury Thomas's aphorism, "Spasmodic advertising is "of very little use," ought to be posted up in every counting-house; for it conveys a great truth which has been worth many millions to those who have received and acted upon it.

### The South Metropolitan Company again in Parliament.

Notice has been given, on behalf of the South Metropolitan Gas Company, of an intended application to Parliament in the ensuing session for leave to introduce a Bill to amend the Company's Act of the present year in respect of the qualification of Director of the Company. This is not an unexpected proceeding on the part of the Company, as those of our readers who have followed the working-out of the recent policy of the Board in Parliament and elsewhere will understand. The new notice covers both the qualification of the ordinary, and of the employee Directors whose appointment was sanctioned by the Act. We do not know what alteration may be in contemplation in regard to the qualification of ordinary Directors; but it can only be intended by the new Bill to restore that of employee Directors to something like the figure originally propounded by the last Bill, and altered in Committee against the wish of the promoters. According to the view of the matter taken and expressed by the Chairman of the Company, Mr. George Livesey, the action of the House of Commons Committee which altered the qualification of the employee Director from the possession in his own right of £80 nominal of the ordinary stock of the Company, and made the figure £250, reduced the entire scheme to nonsense. There was no help for it at the time, however, as the Chairman explained to the proprietors at the general meeting in August. To have stood out against the Committee would have entailed the sacrifice of the whole Bill, which was too important to be dropped on a point of detail; and policy dictated its acceptance, which could not prejudice any further action that the Company might deem desirable. There is, of course, no reason at all why this consequential action should be delayed over another session. The new Bill will go before a different Committee, and, being devoid of all financial complications, there will be nothing to intercept or colour the view of the direct issue which the Committee will be invited to take. Nevertheless, it would be rash to anticipate an easy passage for the measure.

### Another Legal Victory for the Welsbach Patent.

In our "Legal Intelligence" to-day will be found a special report of the proceedings taken in the Chancery Division of the High Court of Justice, before Mr. Justice Romer, by the Incandescent Gas-Light Company against the Meteor Incandescent Light Company. We have reported the speech of Mr. Terrell, Q.C., for the plaintiffs at length, because it both explains the Incandescent Gas-Light Company's position, and demonstrates the importance of the action, which might otherwise be overlooked. The defendants did not appear in Court, though from their previous proceedings it was to have been inferred that they intended to defend the action and try to make good their advertised pretensions in regard to their "mantle." It is unnecessary for us to draw the moral from this utter collapse of an apparently threatening case; but, in justice to the Incandescent Gas-Light Company, who have been put to great trouble and expense in fighting these infringement cases—and have thereby naturally been prevented from devoting themselves wholly to the technical and commercial development of their business to their own and the public advantage—it is necessary to explain how this Company at present stand. Before Friday's judgment, the Company were in a position (created by the judgments of Mr. Justice Wills and the Appeal Court) to obtain interim injunctions against parties making mantles infringing their patent of 1885; but inasmuch as the use of thorium was not specifically mentioned in this patent, though actually covered, they might have experienced some difficulty in persuading any Judge to grant an interim injunction on this patent against makers of thorium mantles. The effect of Mr. Justice Romer's decision is, among other things, to remove this uncertainty; so that henceforward the Company will be able to procure an interim injunction against makers of, and dealers in, mantles containing any proportion of thorium. The Company consequently have indisputable control of the whole group of substances known to-day to be capable of being used in the manufacture of incandescent gas-burner mantles, with the sole exception of the chrome and alumina mantle made by the Sunlight Company. The technical and general public should therefore be on their guard against all representations claiming the discovery of new incandescing elements lying outside the Welsbach patent, especially when admittedly obtained from the sources of those "rare earths" of which so much has been heard in connection with the incandescent gas-burner litigation.

## WATER AND SANITARY AFFAIRS.

Statutory notices have appeared of the Purchase Bills by which the London County Council propose to acquire the undertakings of the eight Metropolitan Water Companies. There is to be a ninth Bill, by which, "in the "event of the Council purchasing the undertakings," they shall have power to raise money by the creation and issue of consolidated stock or annuities—the latter to be either perpetual or terminable—to such an amount as may be necessary for the purposes of the purchase. Or the Council may use, for any such purchase, money standing to the credit of the Consolidated Loans Fund. The Bill is also to define the period within which provision should be made for the redemption of such stock, and to prescribe as to the payment of interest or dividend thereon out of the Consolidated Loans Fund "and county rate." The Council are to be enabled to include "in their estimates "and precepts for the purpose of the county rate, such sums "as may be requisite for those purposes." By "those "purposes" we are to understand such as are involved in "any such purchase." The question is one which concerns the ratepayers, and they may see that there is to be a redemption fund, to defray which, together with such other expenses as must necessarily accrue, the county rate may be called in aid. As the Companies have no redemption fund, and have no claim on the county rate, the financial position will be essentially altered should the proposed purchase take place. An additional burden will be thrown upon the finances of the water supply; and either there must be an increased charge for water, or an enlarged estimate for that unlimited impost—the county rate.

As directly affecting the Water Companies, we may contrast the Bill which concerns any one of them with that by which the Company would have been dealt with had the Transfer Bill relative to that undertaking been passed in the last session. One Purchase Bill, in fact, corresponds to the rest. In the Bill of 1895, revived in 1896, it was provided that unless terms of purchase were settled by a certain date, the Council should enter and take possession; the price to be determined afterwards by arbitration. It is now proposed, in default of agreement, that provision shall be made for the compulsory purchase and acquisition of the undertaking by the Council; the date of transfer and the terms and conditions thereof to be determined by the Arbitrators, "or defined by the Bill." What this latter phrase is intended to cover appears by a paragraph farther on, where we are informed that the Bill is to authorize and provide for the method of entering into

possession of the Company's undertaking "before the "ascertainment of the consideration-money." This seems to be nothing less than reviving the clause, so thoroughly discredited when first proposed, whereby the Council were to be enabled to seize upon the undertakings not only before the price was paid, but before the amount was settled. As to the mode of estimating the value of the undertakings, there seems to be some improvement on the original scheme, though we hardly know how to trust the Council so far. In deciding as to the "fair and reasonable "value" of the undertaking, the former Bill recited a number of conditions, all adverse to the Company, which were to be taken into consideration by the Arbitrators, while nothing in the Company's favour was allowed. This most extraordinary procedure was set aside by the Select Committee of last year, who decided that the Arbitrators should be at liberty to take evidence as to value on all the points concerning which they thought proper to receive information. The decision of the Committee in regard to this matter is apparently comprehended in the scheme of the Bill. But there is one point affecting value, in which the obvious intention of the Select Committee is ignored. According to a statement made by the Chairman, it was the intention of the Committee to give the Arbitrators an optional power to award a sum in respect of compulsory purchase. This itself was a very restricted proposal, offering scant justice to the Company; but even this modicum of justice is to be omitted from the coming Bill, as in the Bill of 1895, it being proposed that "no "addition" shall be made in respect of compulsory sale.

The Select Committee of 1895 were disposed to put a clause into the Lambeth Bill, and of course into all the eight Bills, by which the Council would be debarred from purchasing one or more of the undertakings without acquiring the whole. In accordance with a recent resolution of the Council, a clause to this effect is now to be introduced. An interesting part of the project is that which relates to the districts outside London. On this point there is a considerable correspondence between the plan laid down in 1895 and that which is now proposed. Power is sought for the sale or transfer to any other county of local authority of so much of the works of distribution acquired by the Council as is exclusively appropriated to the distribution and supply of the outlying district. The sale of water in bulk to the outlying authority is also to be provided for. One part of the intended Bill is to authorize the formation of a Committee, composed of representatives nominated by the Council and the Corporation of the City, who are to have the management and administration of the supply of water within the limits, or any part of the limits, supplied by any of the Metropolitan Water Companies. This is a repetition of the former proposal for a Statutory Committee, and is probably intended to gain the support of the Corporation in Parliament. It would also appear that representatives may be sent to this Committee from other county councils and local authorities, though we can hardly suppose this is seriously intended, seeing that the outer areas are to be cut off from the rest. One proposal is plain enough, which is to provide for applying in aid of the intended purchase the sinking funds held by the Chamberlain of the City of London. We may mention that, as the district of the Chelsea Company is entirely within the Metropolitan boundary, there is no provision in the Bill concerning this Company with respect to an outlying area.

We may now ask whether there is any probability that Bills of this character will ever receive the sanction of Parliament. At the root of all lies this question—Is the London County Council a proper body to have charge of the water supply of the Metropolis? According to its own showing, it is not qualified to have charge of the water areas outside the Metropolitan boundary. Yet it is perfectly certain that the Government will not approve of any scheme by which the water supply, as it now exists in and around London, is to be severed into what would be practically an inner circle and an outer ring. Any severance is objectionable, for financial as well as physical and sanitary reasons. The assertion of the Council that there should be one public authority instead of eight Companies, demands that the Companies should be fully absorbed by the authority. London is growing, and the water supply must grow with it. As for the inherent qualifications of the County Council, "The Times" suggests a by no means favourable reply when it asks, after having discussed the extraordinary proceedings of the Works Committee: "How does the transfer of the London "Water Supply to the County Council strike the public in "view of these revelations of incompetency?"

In addressing the West Middlesex Water Company at the half-yearly meeting held last week, the Chairman—Mr. E. Boulnois, M.P.—stated that the Directors of the Company would oppose the Purchase Bills of the County Council. Speaking of the apparent intention of the Government to bring in a Bill dealing with the question of the London Water Supply, he felt justified in predicting that if it were drawn on the lines of the last Bill, and allowed the County Council to be the predominant partner in the authority, there was not very much likelihood of the Bill passing. Mr. Boulnois' speech seems to suggest that there is very little chance that Parliament will do anything with the water question next session, unless the Government devise a plan which will altogether oust the County Council. But the Council thought they were left very much out in the cold even by the former Bill. Another aspect of Parliament towards the water question was mentioned by Mr. Boulnois, and consisted in the perpetual checks and burdens imposed upon the Companies by the Legislature. Something has been gained, as by the passing of the Staines Reservoirs Bill. But the sinking-fund clause is a heavy tax, which stands in strange opposition to the handsome discount allowed by the West Middlesex Company to their consumers.

Dr. Klein has felt it necessary to write a long letter to "The Times" in defence of his multitudinous microbes. He declares his Winchester quart bottles were sufficiently sterilized. If Professor Percy Frankland is puzzled by the discrepancy existing between his (Dr. Klein's) results and those of Mr. Dibdin, one puzzle is met by another—Dr. Klein referring to the analyses conducted by Dr. Frankland as showing some high results in January and February last, and as giving sometimes very different results for the same water. It would seem as if during the early part of the year the intense cold interfered very materially with the working of the filter-beds. So far as authorities go, we have on one side Dr. Frankland, Professor Percy Frankland, Mr. Crookes, and Professor Dewar, all in substantial agreement; while on the other we have Dr. Klein—Mr. Dibdin apparently standing midway, though Professor Percy Frankland rather claims him as a supporter. A correspondent of "The Times," who signs himself "R.," throws considerable light on the subject. He calls attention to a fact which is very much overlooked—that bacteria multiply with enormous rapidity in "pure water;" the rate far exceeding that which occurs in the unfiltered water of a river. This writer gives reasons for his belief that results based upon samples collected in the manner Dr. Klein describes "are absolutely worthless for any "rational purpose whatever."

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**The Bacterial Purification of Water.**—In view of the controversy which is now going on in regard to the purity of London water, special interest attaches to the paper on the above subject which Dr. Percy Frankland, F.R.S., will read to-night at the Institution of Civil Engineers.

**Manchester District Institution of Gas Engineers.**—The 108th quarterly meeting of this Institution is to be held at the Midland Hotel, Bradford, next Saturday, under the presidency of Mr. Isaac Carr, Assoc.M.Inst.C.E., of Widnes. According to the programme issued by the Hon. Secretary (Mr. S. S. Mellor, of Northwich), the proceedings will be of a particularly interesting character. On arriving at Bradford, the members will visit, by permission of the Mayor (Mr. T. Speight), who is the Chairman of the Gas and Electricity Committee, the electricity generating station of the Corporation, over which they will be conducted by Mr. A. Gibbings, the Electrical Engineer. Luncheon will afterwards be served at the Midland Hotel; and the meeting will be held at two o'clock. Five new members are to be proposed; and Mr. Carr's successor is to be elected. The members will then testify their appreciation of the services rendered to the Institution by the Hon. Secretary during the past seven years, by presenting him with a gold watch and chain, a purse of gold, and an illuminated address. The technical portion of the proceedings will consist of three papers—one by Mr. G. E. Stevenson, M.Inst.C.E., on "The Comparative Cost of Supplying Light by Gas and Electricity in Manchester;" another by Mr. Thomas Newbigging, M.Inst.C.E., on "Illuminating Power as Exhibited in the Parliamentary Returns;" and the third by Mr. T. N. Ritson, Assoc.M.Inst.C.E., on "The Position of the Sulphate of Ammonia Market." These should give rise, if time permit, to good discussions.

# ESSAYS, COMMENTARIES, AND REVIEWS.

## GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 1031.)

THINGS were not very gay on the Stock Exchange last week. The public remained very quiet and cautious; while the professional speculators had got rather more on their hands than they could carry. The position of some of these gentry whose field of operation was the Kaffir market, gave rise to much uneasiness; and despite desperate attempts to bolster them up, one of them was let drop after all. This sort of thing upsets quieter folk elsewhere, and makes them uneasy and suspicious; and so business in general was rather bad, and prices in pretty well every line have gone worse. The position of the Money Market, too, was rather bewildering, and some were quite prepared to see the Bank rate up on Thursday; but it did not move. Even now the position is very uncertain; and it is almost impossible to see far ahead, so much depends on factors which are at present in the dark. Business in the Gas Market was good and active; and there was no falling off in the volume of transactions effected. Gaslight issues had their full share. The "A" opened very strong, and even added a point to its gains of the previous week—changing hands repeatedly at 322. The price was now so good that the inevitable profit-taking began; and the figures declined. The reaction, however, so far was only slight; and nothing was marked lower than 317. On Wednesday, there was a revival in the secured issues of every description, which commanded very good prices, though they could not improve on their quotations. Business in South Metropolitan was fair. The quotation was advanced a point; but the marked prices did not show out higher. A little was done in Commercials at good average figures. The Suburban and Provincial division exhibited a fall in British. Brentford new was sold cheap on Thursday—the minimum price placed upon the recent issue being much below the market figure; but the stock took its old position again the next day. Among the Continentals, Imperial was pretty steady, though not disposed to go stronger. No facts have transpired affecting the position; and just now it is on a balance of hopes and fears. Union and European made no sign. In the distant parts of the earth, there was a slight recovery in Sydney and Melbourne bonds; and Bombay new advanced. The Water Companies were rather more active; but prices quoted were mostly stationary. Lambeth, however, had a good rise. Kent new, on the other hand, receded.

The daily operations were: Business was not very active in the Gas Market on the opening day; but prices were good. Quotations advanced a point in Gaslight "A," South Metropolitan, Sydney, and Melbourne. Lambeth Water rose 5. Tuesday's transactions were more lively; and prices were very firm generally. British was an exception; and it fell ½. Wednesday was quieter; and the reaction in Gaslight "A" began with a drop of 1. Transactions on Thursday were for the greater part at good steady figures, especially in Imperial Continental. Brentford new was lowered 2. On Friday, Brentford new was put up again; but prices in the rest showed no change. In Water, Kent new receded 2. Saturday was a fairly active day. Gaslight "A" was put back 1; but Bombay new rose ¼.

## ELECTRIC LIGHTING MEMORANDA.

**The Firing of St. George's Church, Hanover Square—Motor Car Madness—The Electrical Cab Project—Accumulators versus Horseflesh—The "Electrician" on the Gas Tramcar.**

IT can be easily understood that such misfortunes as the firing of the tower of the famous church of St. George's, Hanover Square, by the over-heating of wires in connection with an electric motor used for blowing the organ, are very discouraging to the partizans of the electric lighting industry. It is particularly vexatious that this mishap should have occurred just now, when the subject of fire insurance is causing so much unexpected trouble to electricity supply undertakings. Only a week or two ago, one of our electrical contemporaries pleaded with the insurance offices for more considerate treatment of central supply stations, on the score of the number of fires hypothetically prevented by the extension of electricity supply in towns; and this is the comment which the irony of fate has made on this pretension! Unhappily, also, the public which will naturally take the most notice of this fire at St. George's is precisely that to which electricians look for patronage both in town and country. It is no longer an imperative dictate of the fashion that rules the conduct of people in "high life," that the marriages of the British aristocracy should be solemnized at St. George's, Hanover Square; but the celebrated old church of the "upper ten" is still the centre and the symbol of one of the greatest interests of the most influential and wealthiest order in the community. The mere fact that errant electricity has chosen this most conspicuous theatre for an exhibition of its least amiable propensity, is an unkind freak of Fortune, from which the electric lighting industry will suffer disproportionately to the actual damage done.

It is a remarkable illustration of the speculative spirit of the age, and the enterprise—not to give it a stronger term—of company promoters, that no less than a couple of millions sterling has been offered for public subscription in order to start the motor car industry, a considerable proportion of which sum is to be applied in developing the electric side of the new method of locomotion. Seeing that by common agreement there is not at the present time in existence a satisfactory mechanical road carriage, electrical or otherwise, this is a modest draft upon the credulity of the public. The most impudent of the new proposals, however, as we remarked last week, is that of the London Electrical Cab Company, the promoters of which have captured several of the leading illustrated newspapers, and obtained the blessing of the financial journals. There is nothing wonderful in the latter performance; but that respectable newspapers should have been prevailed upon to make so much fuss over what this Company mean to do, before one of their cabs has appeared on the road, is a singular instance of the power of a new idea to blind people's judgment. Of course, when "Motor Day" came, not a single electrical road carriage was ready to make the trip from London to Brighton; but the Electrical Cab Company got their advertisement all the same. Once more, the enterprising electricians had to make the best they could of what they were "going to do" in the following week. The week has passed, and still London waits for the electrical cab.

Meanwhile, the promises of the Cab Company wax ever more engaging. When they put their cabs upon the streets, they are not going to employ inexperienced men to drive them. Oh! no—none but men who have driven electrical cabs all their lives are to be eligible for this employment. At least, so we gather from the soapy lucubrations of the Company's financial journalist. This is, naturally, most reassuring to intending investors. Moreover, every cab is to have "two sets of accumulator cells, which can be charged in a few minutes at any supply service, and the vehicle will work at whatever rate of speed may be required, go either backward or forward, and turn sharp angles with ease and security." There you are, you see! Apart from the necessity for writing in the future tense, what could be more satisfactory? "A calculation made by Messrs. Kincaid, Waller, and Manville shows that the expected cost of working each cab per day will be 5s. 7½d.; and as the price paid by cabmen under the Asquith award averages 12s. 2½d. a day, it appears that there should be 6s. 7d. per day available as profit." From this firm datum—mark the rigorous accuracy which works out the running expenses to a half-penny a day—the computation of the Company's dividend is only a matter of the simplest arithmetic.

Our candid contemporary, the "Electrical Review," devotes an article to the "slating" of this marvellous estimate. It begins by giving due prominence to the fact that "no electrical carriage got through to Brighton," and proceeds to discuss the prospects of the electrical cab which was so nearly ready to do it. The first thing our contemporary shakes its head over is the accumulator, of "special patented design," which is to do what no accumulator has ever done yet. Then it is pointed out that manufacturers of accumulators have absolutely no experience in cab running; so that nobody knows how the batteries are likely to stand this kind of work. The supply of current for charging the batteries is priced at 1½d. per unit; and even then the supply will cost 2s. 9d. per cab per day. But where can electricity be bought at this price; and, even so, how does 2s. 9d. per day for current only compare with the corresponding horse keep? It is our contemporary's opinion that "the electrical engineers who push electrical car schemes never seem to think anything of horse cost, either as to its life, its food cost, or its scrap value. Neither do they vouchsafe any information as to the electrical losses between dynamo and cells, between cells and motor, or between motor and car axle. The life of flimsy cells is short, their first cost is great; and the current costs are likely to exceed the quoted 2s. 9d. per day, even on the improbable 1½d. per unit basis—improbable not simply on the face of it, but in face of possibly 25 to 50 per cent. of losses between dynamo and car axle."

So far as one can see, if a pair of accumulator cells costing £100 is required for every cab, there must be at least another pair kept in reserve for every two cabs, to provide against breakdowns. This makes £150 for the motor appliance for a single cab, saying nothing about the moving parts. A cab in full work requires two horses a day, at a cost of (say) £33 apiece. The cab industry as it exists to-day is one of the simplest character; but to replace the horse by the accumulator would turn it into a business requiring large capital and expert management of several different kinds. And at the very best, if the accumulators never failed, and the cabs never had to be dragged home ignominiously with a jeering crowd of loafers and boys walking behind them, it is difficult to see how the electricity is to justify itself in comparison with horseflesh. Even for this picture it is necessary to look far into the future. As our contemporary observes: "Taking a general view of the motor car to-day existent, we may say, much as we regret it, that the electrical car is nowhere; and in face of the as yet unsatisfactory nature of petroleum cars, electricity must be a very bad nowhere indeed, for the run of Saturday was only a success in a sense. It was a mere promoters' bubble show; and it showed that, of

some thirty cars, only about eleven turned up at Brighton before six o'clock, having started at 10.30 from London. The whole thing was engineered to secure the public; and when the public has been duly caught, the bulk of the men so prominent on Saturday will be as innocent as a judge of all connection with motor cars."

Our contemporary the "Electrician" has been trying to depreciate the prospects of gas tramcars. It evidently thinks the gas-power car a formidable rival to the electrical car, and takes particular pains to refute the claim of the former to superior facility for experimental trial. "We are told that gas traction has an advantage over electric traction in not requiring a central station to be built. We presume that in the case of gas-car traction it would be necessary to be connected to some sort of gas-works; and if that does not correspond to a power-house, we do not understand the situation. No doubt the tramway company has not to invest capital in gas-works; but what does that matter, since it will have to pay such a price for its gas that the interest on the capital invested by the gas company is covered? The tramway company buying gas from the gas company is in a parallel position with the tramway company taking power from an electric light station." Is this a quite candid statement of the conditions of working an electric and a gas-power tramcar respectively? Is taking a supply of gas from a street main exactly the same as building a gas-works and working it for the purpose of yielding this supply?

## OBITUARY.

By the recent death, in his 61st year, of Mr. F. B. Hallowes, the Directors of the Redhill Gas Company lose an esteemed colleague who for a long time held the position of Vice-Chairman.

The Luton Water Company have lost an experienced Chairman by the sudden death, at Brighton, of Mr. Charles Mees, J.P., aged 74 years. Mr. Mees was a self-made man, and was closely associated with the development of Luton's staple trade. Through keen business capacity, he amassed a considerable fortune; and his foresight and acumen were of much service to both the Water and the Gas Company at Luton. He was a Director of the former for 25 years, and Chairman for 18 years. At a special meeting of the Company last Wednesday, a vote of condolence was passed with the widow and relatives.

Mr. T. Pitts, jun., whose death occurred suddenly at his home at Plymouth on the 27th ult., was a Director of the Plymouth and Stonehouse Gas Company, and during the past few years filled the position of Deputy-Chairman. Few men in the West of England were better known; and none were more esteemed. In business he had a wide connection; while as a popular colonel of Volunteers, a member of the Plymouth Corporation, a prominent politician, and an active Churchman, he touched the life of the locality on many sides. His death, which was due to heart disease, evoked a general expression of regret; and a movement is now on foot to perpetuate his memory by the foundation of a memorial hall for mission and other purposes in Charles Parish, Plymouth, where for many years he was a churchwarden. Towards this project, two donations of £100 each were announced last week—one from Sir E. Clarke, Q.C., M.P., and the other from an anonymous source.

The sudden death of Sir Benjamin Ward Richardson, at his residence in Manchester Square, W., last Saturday morning, at the age of 68, removes one whose name a few years since figured not unfrequently in our columns, in connection with his publicly expressed views on sanitary questions. In this respect, he was a firm supporter of the late Edwin Chadwick; and to their combined labours we owe the increased attention which is now given to what is known as sanitary science. It is nearly a quarter of a century ago—in 1875—that, at the Social Science Congress, Sir Benjamin (then Dr.) Richardson gave a sketch of his Hygeia—the model "City of Health;" and from that time, by articles in newspapers and by public addresses, his constant endeavour was to realize his ideal. He was devoted to the cause of temperance, and was a strong advocate of judicious athletics. In 1868, he was presented by a number of his brethren in the medical profession and fellows in science with a microscope and one thousand guineas, "in recognition of his various contributions to science and medicine." A great deal is heard just now about the Röntgen rays. But it seems that their discovery by this investigator was anticipated to a large extent by Sir Benjamin Richardson, who as long ago as 1868 laid before the British Association an account of some experiments he had carried out on the transmission of light through animal bodies. He graduated in medicine at St. Andrew's in 1854, became a Licentiate of the Royal College of Physicians in 1856, and a Fellow in 1861. The honour of knighthood was conferred upon him in 1893.

**The "Murdoch Memorial Gas-Engine,"** which, as mentioned at the last annual meeting of the North British Association of Gas Managers, is to form part of the physical laboratory of the Glasgow University, on the suggestion of Mr. Andrew Stewart, who has been a liberal donor to the institution, was formally presented yesterday by Professor Barr, and set to work.

## THE SECRET OF SUCCESS OF THE STANDARD OIL COMPANY.

We are able to conclude to-day our notice of Mr. H. D. Lloyd's interesting work entitled "Wealth against Commonwealth" (see *ante*, pp. 841, 955).

Mr. Lloyd discusses the revolt of the citizens of Toledo against the local branch of the Standard Oil Company, represented by the two nominally competing, but really united, natural gas companies (referred to at the close of the last article), as a stroke for municipal freedom. He states—what we did not know before—that the same proprietary had control of the natural gas supply of many other towns in the same region; so that the question raised at Toledo was really whether it was possible to make "another step forward in the world-wide movement for the abolition" of the millionaire monopolists. This, of course, is his picturesque way of putting it. Probably the other side would be able to show that there was not much millionairism about the natural gas supply of any town in the region, much less Toledo. At any rate, the conflict over the municipal natural gas supply scheme was very severe, and raged over a wide extent of territory; some of the methods of warfare employed in it being of a peculiar character, judged from the European standpoint. Eventually, in the year 1891, the municipal supply was started; the charge for gas being fixed at 8c. per 1000 cubic feet. "The private companies were charging 12c. per 1000 feet, or 50 per cent. more. Profits were such at this charge of 12c. per 1000 feet that in some tracts single wells would repay the cost of the land every four days and two hours, or 89 times a year." Good business, this! No such particulars as those Mr. Lloyd has marshalled respecting the natural gas question have ever before seen the light outside obscure official and legal publications. At the end of 1891, the city of Toledo had 3299⅔ acres of gas lands; and in the following March 55 wells were yielding upwards of 50 million cubic feet of gas, equal to 3500 tons of anthracite coal. A year later, the undertaking was paying for itself; but of the history of the venture after 1893 Mr. Lloyd unfortunately does not speak. Is Toledo still supplying itself with natural gas, and are the private companies still extant?

Mr. Lloyd touches upon the "flash-point" controversy, and describes the simple but effectual plan of action by which the Standard Oil Company have secured the monopoly of oil distribution. By this road he reaches the point in the controversy where the question naturally arises: What is the effect of all this? "Are the combinations, trusts, syndicates of modern industry organized scarcity or organized plenty? dearness or cheapness?" One prominent member of the oil combination is reported to have declared, for himself and his associates, that "they are doing their work cheaper than any rival organization can afford to do it, and that is their policy; and by that only will they survive." Mr. Lloyd denies that this is so; and he adduces much evidence to prove that while competition in the oil trade existed the consumer was better off, and that with the strengthening of their monopoly the Standard Oil Company have everywhere put up the price of their staple. Evidently feeling uncertain of his ground, however, the author suddenly shifts his position, and declares that "to prove that oil is cheaper than it was, is not to prove that it is cheap. Anything begins to be dear the moment the power to fix the price has been allowed to vest in one. The question whether our monopolies have made things cheap or dear in the past, pales before the exciting query: What will they do in the future, when their power has become still greater, or has passed by death, descent, or sale into hands less shrewd and greedier?" This line of argument savours of prejudice. An advocate on the other side would be able to adduce numerous instances where the fruits of a particular industry have not only been cheapened, but also where the industry itself has been preserved from extinction, by consolidation. Similarly, many once flourishing industries have actually perished, and others that could be named are languishing—like British agriculture—simply because the meagre profits realizable are frittered away, through lack of consolidation, among so many participants, that it is worth nobody's while to look after them.

The results of consolidation strike Mr. Lloyd with an overwhelming force. He cannot away with the idea that where there is consolidation, if there is cheapness, "it comes by the grace of the seller, and that is the first shape of dearness, as security in society by the grace of the ruler is the first form of insecurity." He is appalled by the spectacle of "captains of industry, with a few aids, rearranging from office chairs this or that industry, by mere contrivances of wit compelling the fruits of the labour of tens of thousands of their fellows, who never saw them, never heard of them, to be every day deposited unwilling or unwitting to their own credit at the bank . . . . by the mere mastery of compelling brain, without putting hand to anything, opening or closing the earth's treasures of oil, or gas, or copper, or what not." This state of things will have to be altered, in Mr. Lloyd's opinion, if the world is to continue worth living in. He is willing to admit, when all is said, that concentration and consolidation spell riches for those who are able to work upon these lines. His trouble is that the new wealth thus created is too great for the old forms of proprietorship. The monopolist must be

"institutionalized," and then all will be well. Unhappily for the writers' credit, he becomes incoherent just at the point where all other would-be industrial reformers lose themselves either in generalities or in personalities—he cannot tell us how to set about making the desirable change. By reason of this defect, the concluding chapters of the book, which should have crowned the whole work, are mere rigmarole of the order with which modern Socialist writers and spouters have made us so unhappily and unprofitably familiar. Upon the fly-leaf of the book there appears a commendation from a Mr. Edw. E. Hale—presumably an American citizen of light and leading, from the prominence given to his remark that Mr. Lloyd's is "as much an epoch-making book as 'Uncle Tom's Cabin.'" This is ridiculous; because if there was a conspicuous, unmistakable "moral" in any work of fiction ever written with a purpose, it was Mrs. H. B. Stowe's call to American humanity to liberate the slave. Right or wrong, reasonable or inexpedient, this was the clear issue raised, or forwarded, by "Uncle Tom's Cabin;" and this was the dividing-line that separated the North from the South until it was wiped out by an ocean of blood. Where is there any such issue in the book we have been reviewing at the length which the importance of the subject, rather than the merit of the treatment, seemed to deserve?

We have been willing, on general principles, to follow Mr. Lloyd patiently and with implicit confidence through his laboured denunciation and partial exposure of the system by which the great commercial, industrial, and transport monopolies of the United States have attained their present preponderance in the home, and their influence over international trade. But in the end, we are fain to confess that he has led us into a "No Thoroughfare." It is impossible to get up a passion of indignation over the declaration of a leader of the Oil Trust, often quoted by him, "that this business belongs to us." Why not—if this is the most effective organization in and for the trade? There are no ethical questions at issue in such a proposition, though there may be, and probably were, in regard to the manner in which the first steps towards the attainment of control of the trade were taken. After the realization of a scheme of conquest, however, the principle of *beati possidentes* comes into force in this connection, as it always has done in the history of this fighting, struggling civilization of ours.

In so far as the present position of the Standard Oil Company is the result of what Mr. Lloyd terms "the mere mastery of compelling brain," there is nothing to be said against it in a world where might, of the kind needed in the case, has always been, and probably always will be, right. If the great American public do not like the result, there is no help for it. If it is the process, so far as it has been encouraged by their own political and economic system, to which they take exception, they should set themselves to overhaul and reform the latter. From all that Mr. Lloyd has to narrate by way of history, it is to be gathered that the worst features of the "trust" movement in the United States have been due, in the first place, to the imperfections and weaknesses of the Federal and State legislative and judicial systems, and more remotely to the ignorance and apathy of the people, who have allowed themselves to be deluded by the superstitions of protection from foreign competition in trade, and the universal efficacy of competition among traders at home. Those wrongs which Mr. Lloyd alleges against the monopolists of his country's wealth in coal and oil and other things, could not have been perpetrated in this country, with all our legislative and administrative shortcomings. No trader can procure an unfair advantage in the matter of railway rates; and no railway can set the executive at defiance. Moreover, it would be useless for a particular clique of British manufacturers to combine with the object of unduly forcing up the price of a manufactured article, with every port open to the world. From the English point of view, which is based on experience, the United States suffer from the repression of mercantile competition where it would benefit the consumer, and from reliance on competition just where it is certain to prove illusory. A sense of the benefit derivable by the consumer or user of certain products of essentially local enterprise, such as gas or a railway, by efficient control vested in a competent public authority, is apparently lacking in the people for whom Mr. Lloyd writes; and he is as blind in this respect as those whom he essays to lead.

Mr. Lloyd may or may not class himself as a Socialist writer; the point is of no practical importance. But we desire to take this opportunity for assuring him and the professed Socialists, that the world will never heed them so long as they continue to flatter themselves that they are fulfilling their mission by abusing monopolists individually or collectively, and aspiring after a Utopia to which they are unable to point the way. The administrators of the Standard Oil Company have succeeded because they are immeasurably superior in point of efficiency to their detractors of the Lloyd kind; because they not only knew what they wanted, but also how to get it. And what they knew how to do, they did with all their might. The most "advanced" Socialists cannot take the first step on the road which they claim to be of their own marking out. There is not even a Dr. Jameson among them. Thus it is that we, in the capacity of watchers of the economic course of the work-a-day world, have been driven to give up the fruitless task of perusing professedly socialistic literature and journalism, with the object of becoming acquainted with the contemporary workings of the socialistic cause, if there are any. As a matter of fact, there are none. Of the books we cannot now speak at any length. The socialistic and so-called "Labour" journals, which appear and disappear from time to time, never contain anything more to the point than diatribes against the patent effects of poverty in our midst, and some miscellaneous matter relating to the personal concerns of those who are engaged in exploiting the "movement," which many of them do with a knack for "individualism" that would reflect credit upon any friend of the established order of things. There is nothing distinctively socialistic in feeling for the poor—even in one's pockets; and the connection of the prospects of realization of the socialistic millennium with the private fortunes of this or that professional agitator is sufficiently tenuous to escape an impartial observer with any sense of the congruity of things. In the book from which we now part—not without admiration for much of the author's work—the dictum is expressed that "ownership of the highways ends in ownership of everything and anybody that must use the highways." Without staying to debate this proposition, will Mr. Lloyd, or somebody else who thinks himself called upon to make the crooked ways of the world straight, kindly state how, when, and where the general public are to be placed in possession of the "franchise" of the highway that leads to the Socialistic Promised Land—for, of course, there will be no monopoly of this route?

## PERSONAL.

Mr. Druitt Halpin, M.Inst.C.E., has been appointed Consulting Engineer in connection with the proposal to establish an additional water supply for Southborough.

Mr. David Allan, assistant to Mr. G. Smedley, of Buxton, has obtained the position of Manager of the Matlock Bath Gas-Works. There were 60 candidates for the appointment, which was advertised in the "Journal" for the 3rd inst.

Mr. W. Tranter has been elected a Director of the Chertsey Gas Company in place of Mr. J. Bartholomew, one of the founders of the undertaking, whose death lately caused a vacancy upon the board.

Mr. H. P. Maybury, the Gas Engineer and Surveyor of the Malvern Urban District Council, has received an addition of £50 per annum to his salary, to date from Sept. 29. This recognition of the value of Mr. Maybury's services is the more appreciable from the fact that he was quite unaware that any proposition on the subject was to come before the Council; and it must be highly gratifying to him to have the testimony of the Chairman and members of that body to the thoroughly satisfactory manner in which his duties have been discharged during the fifteen months he has been with them.

A very interesting event took place in the Gas Accountant's Offices, Nottingham, on Wednesday evening last, when Mr. W. Garton, the Gas Accountant, was presented by the staff with a solid silver tea service and tray, as a memento of his long connection (extending over forty years) with the Nottingham gas undertaking. Mr. A. Jacklin presided; and Mr. S. Kirkby introduced the matter in a neat speech. Mr. J. Walker made the presentation; and, in asking Mr. Garton's acceptance of the gift, referred to that gentleman's long and honourable connection with the Gas Offices. He said it was the unanimous feeling of the staff that such service should be recognized; and hence the presentation. Mr. Garton feelingly expressed his thanks to the staff for their kindness, and said that he and Mrs. Garton (who was present) would both prize their beautiful gift as one of their most cherished possessions. The tray bore the following inscription: "Corporation of Nottingham Gas Department. Presented to Mr. Wm. Garton, Gas Accountant, by the Staff in the Accountant's Offices, in recognition of his completing over forty years' service with the Nottingham Gas Undertaking. November, 1896."

The twenty-first anniversary of the birthday of Mr. J. H. Canning, son of Mr. T. Canning, Assoc.M.Inst.C.E., J.P., the Engineer and Manager of the Newport Gas-Works, was made the occasion for a tangible expression of the kind feeling entertained for him by the workmen. He was invited to a meeting in one of the retort-houses, when Mr. Dudley explained that they had assembled with the object of presenting to the son of their highly-esteemed Manager a small token of respect, accompanied by their hearty congratulations. It was, he said, a great pleasure to them to show the goodwill which existed between master and man; and they hoped and believed that the son of so worthy a father and master would justify the love and respect shown towards him. Mr. Whitefield, who had been 42 years in the Company's service, then presented Mr. Canning with a gold watch, together with an address which he read. Reference was made therein to Mr. Canning's success at school and college, as well as at the Technical School; and the best wishes of all the workmen were cordially expressed for his prosperity in life. Mr. Canning feelingly returned thanks—assuring the men that he should look back upon the day with pleasant recollections. He then shook hands heartily with all present. He was also the recipient of other presents on the occasion—from the Secretary of the Company (Mr. E. F. Marfleet) and the Engineer's staff.

## NOTES.

### The Revivification of Foul Oxide.

Herr H. Tormin, of St. Johann-on-the-Saar, describes in a recent number of the "Journal für Gasbeleuchtung" a method of revivifying oxide, for which he claims greater economy of labour and time than other methods of revivification afford. He considers that the admission of air with the crude gas deteriorates the illuminating power. Driving air through the fouled oxide while in the purifier by means of a steam-jet, he finds gives a rather uncontrollable heat in the vessel, and water is condensed at the bottom. With few exceptions, the tending of the purifiers and the revivification of oxide are left entirely to manual labour. Herr Tormin bores a 2-inch hole in each purifying vessel, below the bottom grid; and he fits in it a 2-inch pipe, which leads eventually to one of the large shafts of the works. The pipe is provided near the flue with a valve, and each purifier with a cock. The draught of the flue suffices to draw a stream of air through the purifier when the air-valve is opened, and subsequently when the lid is raised. The oxide is thus revivified in the time usually spent in emptying the vessel. The necessary water is sprinkled over the top layer. The oxide does not cake, or throw too great a pressure after being thus revivified six times; but, as a precaution, it is taken from the purifier after the sixth fouling, and revivified in the ordinary way. The temperature within the vessel can be checked by partially closing the valve on it. The smell from the revivifying mass is destroyed by the flue gases.

### An Effect of X-Rays on Coal Gas.

M. Emilio Villari has been experimenting upon certain gases with X-rays, and also with the electric effluve. The gases employed in these researches were air, oxygen, coal gas, hydrogen, and a mixture of air with the vapours of ether and of carbon disulphide. All these gases acted alike, as regards rapidly acquiring and retaining for some time the power of discharging electrified conductors. This property cannot be ascribed to a heating of the gas by the sparks, which heat it very slightly. On the other hand, if the gaseous column contained in a tube is strongly heated by means of a flame, but not activated by sparks, it will not discharge the electroscope. Further researches enable M. Villari to affirm that gases traversed by the sparks seem to acquire a greater conductivity of heat. These experiments were executed with air and coal gas. The silent discharge, or electric "effluve," does not produce in these gases the power of discharging a conductor. It even takes this power away from them if they have previously acquired it. It is well known that the gaseous products of combustion rapidly discharge conductors; and this appears to be a reason why lightning will travel down the inside of a chimney. This efficacy of discharging electrized conductors is completely taken away by subjecting the products of combustion to the electric effluve.

### A Simple Way to Generate Electricity from Heat.

While engaged in experimenting with the Jacques so-called "carbon-consuming primary battery, for the direct conversion of carbon into electric energy," Mr. C. J. Reed discovered what he claims to be an entirely new method of transforming heat into electric energy. This process is an extremely simple one; requiring for its exhibition only a sheet of copper, a piece of copper wire, a galvanometer, and a bunsen gas-burner. He has published a sketch of an arrangement in which a piece of sheet copper is placed horizontally over a bunsen burner, by which it is made red hot; while against the upper surface of this sheet is firmly pressed one end of a stout copper wire—both wire and sheet being connected to the poles of a galvanometer. A strong current is stated to flow, under these conditions, between the hot plate and the cold wire, if a thin film of copper oxide has been allowed to form on the end of the wire in contact with the plate, by previously heating and cooling it in air. The thin film of cupric oxide may be replaced by a film of any conducting oxide or salt not decomposed by the heat. With brass, iron, and other metals, similar results may be obtained. It is not necessary that both wires should be of the same metal. Any two pieces of metal may be used, and even carbon and a metal. The highest results are apparently obtained from the best electric conductors; and it is considered evident that the development of electric potential in this arrangement is due only to the flow of heat over the surface of contact and across the film of metallic oxide or metallic salts intervening between the adjacent pieces of metal. The term "thermo-tropic" is suggested as a name for this action, so as to distinguish it from "thermo-electric" action.

### The World's Oil Supply.

A statement respecting the world's oil supply has recently appeared in "Engineering." It is observed that the market for petroleum and other crude oils is ever widening, and only a slight reduction in price is required to extend the use of oil fuel in ships and for other mechanical purposes; while the extreme simplicity of the oil-motor has in recent years greatly extended its application. The use of mineral oil in illuminating gas manufacture might be included in these prospective developments of the market for cheap petroleum. The bulk of the supply at present comes from the United States and Russia. The former produced last year 53 million barrels of 42 gallons, and the latter 38¼ million barrels, out of a total world's supply of 95 million barrels, which does not include oil used locally and not accounted for. Austria-Hungary gives 1,250,000 barrels; Canada, 802,574 barrels; India, 295,994 barrels; Java, 293,654 barrels; while smaller quantities came from Peru, Roumania, Germany, Japan, and Italy. Great Britain yielded 2,000,000 tons of shale oil. This supply is considered to be scarcely equal to the demand, which is held to account for the increased price. A fresh oil-field is being exploited in South California, and oil occurs in other parts of the United States remote from the present fields. It is asserted, however, that the greatest augmentation of the world's petroleum supply may be expected from Peru, where there is estimated to be 7200 square miles of oil-fields. Peruvian crude petroleum contains 84·9 per cent. of carbon, 13·7 per cent. of hydrogen, and 1·4 per cent. of oxygen. The native product is being sold locally at about one-third the price of the imported Pennsylvanian oil. The crude oil also is being burnt by the locomotives on all the Peruvian railroads; and it is reported to be extensively used in manufacturing establishments, and in the gas-works. This supply of liquid fuel must be of enormous economic value in a country destitute of coal. A good deal more development must take place in the Peruvian oil-field before the influence of this source of supply will be sensibly felt in the European market, or even before the South American continent will be rendered self-supporting in the matter of light and fuel.

### The Analysis of Mortar.

A reprint of an instructive paper on the analysis of mortar, communicated to the Society of Public Analysts by Messrs. W. J. Dibdin and R. Grimwood, has been sent to us by the authors. Building Acts and Municipal Bye-Laws prescribe the composition of mortars to be used in buildings; and the interest of the analytical chemist in the subject begins when he is required to determine whether a sample of what is called mortar is really worthy of the name. Messrs. Dibdin and Grimwood appear to have had an unfortunate experience in this regard, as they state that only in exceptional cases have mortars tested by them come within the prescribed regulations. The paper shows how the proportions of mortar are arrived at, and describes the analytical methods used by the authors. Various suggestions have been made as to the best means of more or less rapidly arriving at a conclusion as to the quality of a mortar; but the authors' experience is against the adoption of any short cuts, for the good reason that, however strong individual opinion on such a matter may be, the evidence is incomplete unless the work is thoroughly done. It is obvious that the analysis may be more or less perfect according to the character of the information required. Examples are given showing the results of a number of analyses of good and bad mortars. It is admitted by the authors that a great deal more work is required to be done in this line before the chemistry of mortar can be regarded as settled.

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**Received.**—"The Model Locomotive Engineer, Fireman, and Engine Boy." By Michael Reynolds. New edition, with revised appendix. "Elementary Engineering." By J. Sherren Brewer. Third edition. These are two new volumes of the well-known "Weale's Technical Series," published by Messrs. Crosby Lockwood and Son, Stationers' Hall Court, E.C. Mr. Reynolds's work comprises a historical notice of the pioneer locomotive engines and their inventors, with a project for the establishment of certificates of qualification in the running service of railways. The little book by Mr. Brewer is a manual for young marine engineers and apprentices, in the form of questions and answers on metals, alloys, strength of materials, construction and management of marine engines and boilers, geometry, and other matters; and it includes a number of useful tables. "Chemistry for Engineers and Manufacturers. Vol. II.—The Chemistry of Manufacturing Processes." By Bertram Blount, F.I.C., F.C.S., and A. G. Bloxam, F.I.C., F.C.S. (London: Charles Griffin and Co., Limited.)

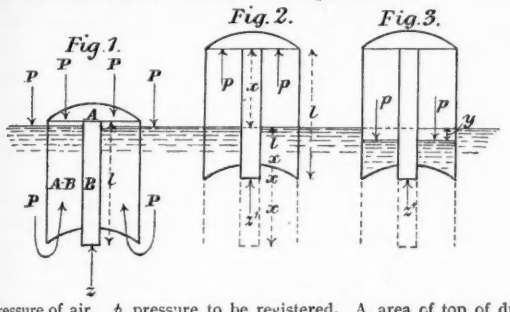
**Petroleum Production in the United States.**—According to a recent American report, the most notable features in connection with the production of crude petroleum in the United States are: (1) The great increase in production, especially in Ohio, Indiana, and California; (2) the decrease in stocks; (3) the rise in prices; (4) the extension southward of the profitable producing districts in the Appalachian range. Briefly summarized, the facts are as follows: The production in the United States increased from 49,344,516 barrels in 1894 to 52,983,526 barrels in 1895; most of the important producing districts sharing in this increase. The production of Pennsylvania increased from 18,077,559 to 18,231,442 barrels; of Ohio, from 16,792,154 to 19,545,233 barrels; of Indiana, from 3,688,666 to 4,386,132 barrels; and of California, owing to the new discoveries at Los Angeles, from 705,969 to 1,208,482 barrels. On the other hand, there was a slight decrease in the production of West Virginia and New York. The stocks of crude petroleum in the Appalachian oil-fields at the close of 1895 were 5,344,784 barrels, as compared with 6,499,880 barrels at the end of 1894. Most of the oil produced in the United States in 1895 was from the Appalachian district; 30,959,139 out of the total of 52,983,529 barrels, or nearly 58½ per cent., coming thence.

# COMMUNICATED ARTICLE.

## THE PRINCIPLE OF THE COMBINED BELL AND FLOAT PRESSURE-REGISTER.

[An American reader of the "JOURNAL," who is interested in the subject recently dealt with by Mr. B. R. Parkinson (see *ante*, p. 358), but does not wish to be personally identified with the matter, has sent us the following communication thereon. He says he wishes it to be read as supplementary to Mr. Parkinson's able explanation of the subject, and not to be taken in any sense as a criticism of it. He adds that he should like to see points of interest to gas engineers more frequently brought up and explained in our columns as Mr. Parkinson has done in the case of bell pressure-recording gauges.—ED. J.G.L.]

Referring to the article by Mr. B. R. Parkinson on "The Theory of the Pressure-Register as Compared with the Common Gauge or U-Tube," given in the "JOURNAL" for Aug. 25 last, I wish to more particularly explain the reasoning by which it is shown: (1) That there is no change in the level of the water surrounding the bell. (2) That the actual vertical motion of the drum for every increment of pressure is proportional to the relative horizontal cross sectional areas of the bell and float. (3) That the difference of level of the water inside and outside of the bell is the direct measure of the pressure.




P, pressure of air. $p$, pressure to be registered. A, area of top of drum (horizontally). B, area of top of float (do.). $l$, length of float and drum. A-B, area of top of bell. W, weight of metal in drum. $w$, weight of a cubic inch of water. $y$, difference in the water level inside and outside of drum. $z$, pressure at a depth $l$ below the surface of the water.

The accompanying sketches show in outline the most common form of register; omitting, however, all parts—such as tank, stand-pipe, chart-holder, pencil-rod, and frame—which are not necessary to refer to. For simplicity, the combined bell and float will be called the drum; the portion of the drum open at the bottom will be referred to as the bell; the portion closed at the bottom, as the float. The top of the drum is shown flat; but it could be convex. The drum itself might be square, or it might be made of two drums, one inside the other; the space between being closed at the bottom, and thus forming the float, while the inside of the inner drum is open at the bottom and forms the bell.

It is necessary to assume, as we are dealing with pressures and not specific gravities, that the metal of the drum is very thin, and that the weight of the drum is the same, whether submerged, only partially so, or at its highest point of flotation—*i.e.*, $W = W' = W''$.

In practice, the displacement of water due to submerged metal is so slight, as compared with the displacement of water due to the float, that it affects but very slightly the results we arrive at by the foregoing assumption.

It is premised: That the pressure exerted on a fluid or gaseous body is transmitted equally in all directions. That the pressure of the air, being exerted on all surfaces with equal intensity, need not be considered. That horizontal pressures inside the drum balance each other—meeting equal resistances from the rigidity of the surrounding metal. That by pressure, intensity of pressure, or pressure per unit of area, is meant, in this case, pressure per square inch. That, when pressure in one direction is met by an equal resistance in an opposite direction, there will be no motion of the body to which the pressure is applied in the direction of the forces in question.

Now, referring to fig. 1, the drum is submerged. Its weight in a downward direction is, of course, met and resisted by the pressure $z$ exerted over a surface B and in an upward direction; or, using symbols, $W = Bz$. The pressure $z$ at a depth below the surface of the water of $l$ is obviously the weight of a cubic inch of water multiplied by the number of these cubic inches (in a column) one below the other from the surface of the water to depth—

$$l \text{ or } z = lw \therefore W = Blw$$

In fig. 1, there is no pressure other than that of air on the inside of the bell.

Now assume (fig. 2) a pressure $p$ exerted under the bell, which pressure we intend the pencil attached to the drum shall record on a chart. This pressure $p$ acts upwards on the roof of the bell (area A−B), and results in lifting the drum to a height $x$ above its previous position. Here again the weight of the drum is met and resisted by the pressure $z$ exerted over a surface B, together with the pressure $p$ exerted over the surface A−B; or, using symbols—

$$W = Bz + p\,(A - B)$$

But $z' = (1 - x)\,w$ for the same reasons that $z = 1w$. Therefore—

$$W = B\,(1 - x)\,w + P\,(A - B)$$

But at the start we assumed $W = W' = W''$. Therefore, substituting the value of W for W', we get—

$$Blw = B\,(l - x)\,w + p\,(A - B), \text{ or}$$

$$p = \frac{Blw - Blw + Bxw}{(A - B)}, \text{ or}$$

$$p = \frac{B}{(A - B)}\,xw$$

But the pressure under the bell is exerted in all directions. As we have considered its upward effect, and as its horizontal effect is *nil*, there is only the downward component to deal with. This tends to displace the water under the bell; and the intensity of this pressure will be indicated by $y$, the vertical distance to which the water is displaced into the weight of a cubic inch of water, or $p = yw$. From these two values of $p$ we get—

$$yw = \frac{B}{(A-B)}\,xw, \text{ or } (A-B)\,y = Bx.$$

But $(A-B)\,y$ is the bulk of water displaced from under the bell by the pressure $p$; and $Bx$ is the cubical contents of the space now no longer occupied by the float, due to its having risen from the effect of this pressure. In other words, the water displaced in the first case flows into the void simultaneously made; and there is no change in the level of the water outside of the drum.

The pressure $p$, just considered, acting downwards, is met and equalized by the pressure of the water upwards, due to the column of water of height $y$, whose weight is equivalent to $yw$, which represents the excess of pressure $z$ at any point in the water outside the drum over like pressure (weight only) inside the drum. Therefore, as before, $p = yw$; and, speaking comparatively $p = y$, or the intensity of a pressure is measured and spoken of in terms of inches of water.

In the equation $(A-B)\,y = Bx$, let $y = 1$ inch. Therefore—

$$x = \frac{(A-B)}{B}$$

Or the rise of the drum due to any increment of pressure will be proportional to the relative areas of the bell and float. Assuming—

$$A = 9,\ B = 3,\ p = 1 \therefore y = 1 \text{ and}$$

$$x = \frac{A - B}{B} = \frac{9-3}{3} = 2$$

which is the rise of drum for each increase of pressure of 1. In other words, for a pressure of 1 inch of water the drum will rise 2 inches, and for a pressure of 4 inches of water it will rise 8 inches, &c.

# TECHNICAL RECORD.

## AMERICAN GASLIGHT ASSOCIATION.

### Annual Meeting at St. Louis.

As noticed last week, the 24th Annual Meeting of the above Association was held on the 27th, 28th, and 29th ult., under the presidency of Mr. C. J. R. HUMPHREYS, of Lawrence (Mass.), who was supported by a good muster of members.

The routine business included the election of 23 active and 9 associate members, and the resignation or removal of 21 names from the roll of membership. Mr. Forrest E. Barker, of the Massachusetts State Board of Gas and Electric Light Commissioners, was elected an honorary member; and the President was appointed to represent the Association at the proposed New York Gas Exhibition. The reports of the Committee on Education and Research, and of the Committee of Standards were read by the respective Chairmen. The Association have done a great deal of work in defining various standards from time to time; but they have not been able to secure the general adoption of the same. The Committee now recommend that the Research Committee should investigate the standards for castings selected by the Society of Gas Lighting in 1892, and report on their suitability or otherwise for adoption by the Association; the adoption of the United States standard gauge for sheet iron and steel; and of standards for the sizes of house piping. The schedule of sizes and lengths of pipes, &c., as recommended in "King's Treatise" was generally used with satisfactory results; but some modifications were necessary when dealing with heavy water gas. They also recommended the publication, in pamphlet form, of any standards that might be adopted by the Association. This recommendation was adopted; and the officers for the ensuing year were afterwards elected.

The President then read his Inaugural Address. He remarked that the general experience of the members was a diminished output, due to the closing of mills and shops. This brought

home to them the uncertainty attaching to large customers; and it enforced the lesson that gas should be made as indispensable as could be to as large a number of persons as possible. They must take a broad view of this question, according to the spirit of the times; and while avoiding the Scylla of extreme progressivism, they must be careful not to drift on the Charybdis of ultra conservatism. A common mistake was the keeping down of capital at all costs, and the spending of a large portion of the revenue in extensions. This was simply taxing the present consumers for the benefit of the future ones. The better way was to increase the capital according to the growth of the business. He proceeded to show, by quotations from "Field's Analysis," that the London Gas Companies, though they increased their capital, were reducing the proportion per ton of coal carbonized and per 1000 cubic feet sold; and he specially dealt with the large sums that had been expended on mains, services, meters, and stoves—all of which were considered proper charges on capital. He was strongly in favour of following this example; but in replacing old plant with new, it was important to remember that the only difference between the cost of the old work and that of the new was chargeable to capital. While taking care to give the customers a good light, they should use every endeavour to develop the use of gas for other purposes. He maintained that a sales department was as necessary as a manufacturing or a distributing one, and should be worked with equal skill and energy. The President expressed himself in favour of differential prices for day and summer consumption; arguing that, as the demand for lighting at Christmas practically fixed the capital expenditure, any additional business that could be brought in without increasing the limit should in common fairness be charged with a less proportion of the amount required for interest on capital. But this matter could be treated in two ways—either with strict justice or merely according to expediency, as that which was wise was not always just, and that which was just was not always wise. It was one thing to arrive at a fair differential price as a matter of principle, and quite another to convince a large lighting consumer as to its justice. The hours of lighting were only 46 per cent. in June, as compared with December; and therefore he argued that a fair differential for fuel gas was $\frac{100-46d.}{100}$ where $d$ represents the charge for dividend per 1000 cubic feet of gas sold. The railways had a similar practice, and offered special rates to secure additional business that could be done without extensions to plant or rolling stock; and while 0·54d. was the limit allowed by strict justice, it would be necessary to follow the customs of the railway companies and go beyond this, if any considerable amount of fuel business was to be secured. Attention was then directed to gas-fires and warming apparatus. While gas was certainly much more costly than solid fuels, there was a greater possibility (as Professor Lewes had remarked before The Gas Institute in 1895) of economizing waste, and getting the largest proportion of the theoretical available heat in a practically useful form. There was too much regard for cheapness in the first cost of the gas-stove, and too little for efficiency. In America, they would do well to discard the custom of having the gas-jets outside the cooking-oven. Internal heating, which was much more economical, was generally used in England and Europe; and if it was a success there, why should it not also be so in the States? It was rather difficult to choose between cheap fuel gas and high-power lighting gas. They might argue from theoretical data, that the consumer did not get any better light from 20-candle gas than from 16-candle; but it was no use to run away from the fact that the public demanded a brilliant light, and this demand could best be met by high-power gas. But the heating power of a gas was as important as the lighting power; and he believed the day was not far distant when the calorimeter would rank side by side in importance with the photometer. A reference was next made to the development of the prepayment meter business in London. Notwithstanding the adverse circumstances he had referred to, the President found, by actual inquiry, that the demand for gas in the United States had increased quite 30 per cent. in the last five years. Remembering the development of natural gas and of electricity that had taken place in the same period, these statistics showed the sterling vitality of the gas lighting business. Turning to Association matters, the work of the Committee on Education and Research was enlarged on; special attention being directed to the need for experimental inquiry into the chemical and physical aspects of the gas industry.

Mr. Charles H. Nettleton, of Derby (Conn.), President-Elect, read the first paper, which was entitled "A Discussion of the Various Methods Employed in the Introduction of Gas-Stoves." It consisted of a summary of the known facts and practices in connection with the subject, with a few criticisms of the same. The use of cooking-stoves had largely advanced of late years. In some figures furnished him by nine of the principal makers, it appeared that the sale of stoves in 1890 was over 11,000; in 1893, it had doubled; and in 1896, it was 66,000. As these makers represented about 60 per cent. of the total production in the country, they could safely assume that 100,000 stoves had been sent out within the past year, which meant an increase of at least £200,000 in the income of the gas companies. In considering the introduction of gas-stoves, they must look at the size of the district, the character of the consumers, the price to be charged for gas, and the personality of the manager, or whoever was in charge of the department. In a very large city, it would probably be a mistake to attempt to control the stove business. On the second head, he believed that neither the very rich nor the very poor used gas-stoves so freely as the middle class. As to the effect of a special price, the evidence was very contradictory. Some said it did well for a time; but after a while the lighting consumers complained, and it became necessary to drop to the special rate all round. On the other hand, some found it a success. He did not see his way to a special rate for cooking, because he could not justify such a course to a large lighting consumer. But he admitted that where the initial price was high, the temptation to try a special rate was very great. It was important to the success of the scheme, that a good salesman should have charge of it. When it was decided to introduce gas-stoves, several questions arose. Should they be given away, loaned, or sold? If the latter, how should the local dealers be met? If the company sold, should it be for cash down, by instalments, or by a charge on the gas used; and should the company make a profit, sell at cost, or for less than cost? Providing stoves free was the most attractive method; and more could be got out on this plan than any other; but there was the cost. He calculated that the actual cost of the stove, fixed complete, would be earned by the profit on the gas used in 18 to 30 months. Against it, there was the large outlay, the rapid depreciation by careless usage, and the risks of accumulating obsolete old stock. He did not think that a great number of people cared to go so far as to actually give stoves away; but many reported very satisfactory results secured by letting them on hire on liberal terms. Others, however, had an experience similar to his own in the matter of hiring, which had led him to discard the system. The stoves were often carelessly used; and in a very short time the customer wanted to have a new one. He therefore soon accumulated a large quantity of old stock. In America, he believed that, with one exception, the system was declining, and the judgment of gas men was against it; but in England, the custom was growing and taking firm root—especially in connection with the prepayment meter. In support of this, he quoted from a paper read by Mr. N. H. Humphrys at the last meeting of The Gas Institute, and said that if there was no other way of gaining the advantages there indicated, he should favour the rental system. He, however, believed that they could be obtained by other means, and without any of the annoyance and expense he and others had experienced. There were several advantages in the company controlling the sale of stoves rather than the dealers; but, on the other hand, he quoted examples of the successful introduction of stoves by persons not directly interested in the gas company. As to the terms of selling, he believed that, while at first the general idea was to make a profit, opinion now turned towards selling at cost, or even less. The plan to which he gave the preference was to sell at 30s. or 40s. less than cost, and with payment by instalments, if the circumstances of the district showed this to be an advantage. A peculiar plan that had been successfully adopted in a city in Illinois, was to return the cost of the stove in gas; or, in other words, if a party paid for a certain quantity of gas, to be used within twelve months, he was presented with a stove *gratis*. The author highly commended cooking lectures or demonstrations, and also the plan of inspection—preferably by means of a woman of practical experience, who reported as to the condition of the stove, and gave any instruction as to its use that was needed. In concluding, he drew attention to the rapid increase in the use of prepayment meters in England; quoting from the published reports of the South Metropolitan and other companies. The South Metropolitan Company had now 35 per cent. of their total consumers on this system, of whom three-fourths used gas-stoves. In July, 1892, they had 18,720 stoves on hire; while now they had 31,195 stoves on the ordinary, and 37,408 on the prepayment system. Allusion was then made to the practice of supplying fittings free, with an extra charge on the price of gas; and it was pointed out that the stove was a great factor in its success. As yet, very little had been done in this way in America. He had taken some trouble in order to arrive at the consumption of gas; and he found that in places where it was cheap, the average per stove was 20,000 cubic feet per annum, and over. In others, it was 15,000 cubic feet; and the lowest return was 8000 cubic feet. One little wrinkle he had heard of while making these inquiries, was to send a gas-stove round the town, fixing it up at a convenient spot in the streets; and inviting neighbouring residents to bring out anything they wanted cooked, and see it done. He approved of this, because the difficulty was to get out the first hundred stoves. This done, they would recommend themselves. Makers of stoves appeared to hold varying opinions as to the attitude of gas companies towards the business. One told him that when the companies took the stoves in hand, they went in only for the cheapest kinds, and discouraged improvements; while another said he always did best in the towns where the gas company controlled the stove sales. When he commenced the paper, he had hoped to be able to prove that there was one system better than any others. But as he progressed, he found so much difference in experiences in various places, that no general rule could be laid down; and he was forced to conclude that, whatever the plan adopted, success or otherwise turned upon the way in which it was worked.

After the President had invited discussion, Mr. E. G. Pratt

supported the conclusions arrived at by the author at some length, and advocated a moderate all round price in preference to special rates. The manager of the stove department should not only be a good salesman, but possess practical knowledge of the application and uses of gas. He also advocated selling stoves outright at less than cost, if necessary, as preferable to the hiring system; and in his experience stove or hardware dealers were of little use in placing gas-stoves. Mr. Littlehales supported the remark that, whatever the plan adopted, a great deal turned on the personality of the manager, as a poor method well worked might secure better results than a superior idea badly introduced. The plan of exhibiting the gas-stove in the streets was a great success in his experience; and in the higher-class districts, he took the stove into the kitchen if desired. He had also placed a class-room at the disposal of a Ladies' Economic Cooking Association. He believed in special rates for purposes other than lighting, and never found difficulty in explaining the fairness of such a system. Mr. Dunbar urged that the consumers should be liberally treated. Mr. Harper gathered from the paper that the system adopted must be accommodated to suit local circumstances, and that no general rule could be laid down. He preferred selling outright —at less than cost, if necessary—to the rental system. The requirements of the district should be carefully studied; and he obtained good results by the employment of a lady canvasser and demonstrator. Mr. C. H. Page advocated selling stoves right out at less than cost. Mr. Lansden and Mr. Roper both spoke in favour of the stoves being handled by the gas company, rather than by dealers. Mr. Cowdery produced a detailed statement of the gas used for purposes other than lighting in Milwaukee; and Mr. Pinkney detailed the methods by which he had established a successful gas-stove connection.

*(To be continued.)*

## THE SEPARATION OF WATER-GAS TAR.

At the recent Annual Meeting of the American Gaslight Association, a paper on the above subject was submitted by Mr. A. S. Miller, of Long Island City (N.Y.).

The author began by explaining that the title of his paper was to a certain extent a misnomer, inasmuch as any tar formed during the making of carburetted water gas from hard coal or coke does not come from the water gas, but from the oil used in carburetting it. The object of his communication was to briefly outline a simple and inexpensive method of separating this oil residuum, or tar, from the water with which it is mixed as it comes from the condensers, scrubbers, &c. He went on to say that when gas oil or heavy residuum is used for enriching in the generator-superheater process, and the gas leaves the superheater at about 1450° Fahr., something like 8 per cent. of the oil used is recoverable as a very fluid tar, the specific gravity of which at 60° Fahr. is about 1·090. The oil residuum from the retort processes is apparently lighter than water, and requires different methods of separation from the tar produced by the generator-superheater apparatus. The difference between the gravity of the tar and water is quite sufficient to ensure complete separation of the two, if there were no disturbing causes. But at temperatures below 140° Fahr., the tar and water seem to have a slight affinity; and emulsions having as much as 66 per cent. of water will stand almost indefinitely without separation. The whole secret lies in bringing the mixture to a temperature of 160° Fahr. or upwards, and allowing it to stand, or to flow slowly.

The author then proceeded with his subject as follows: In ordinary gas-works making water gas exclusively, it is advisable to collect the drainage from the washers, scrubbers, condensers, and all the drips, in a set of pipes that have no connection with the overflow from the holder tanks or any other source of water supply. This being the case, the temperature will easily be kept high in the trunk drain to which all these flow. At some convenient and easily accessible point, this trunk drain is run into a tar separator, made by putting a partition across a tank reaching from the top to about 30 inches from the bottom. The overflow should not be less than 6 feet above the bottom; and the tank may be made deeper with advantage. The tar and water flow into the tank on one side of the partition, and the water runs out of the overflow on the other side, after having passed under the dividing partition. Tanks 6 feet deep, and having a capacity of 3 gallons per 1000 cubic feet of gas made per 24 hours, have been found to work satisfactorily. Inasmuch as the temperature cannot always be kept uniform, some tar will at times find its way beyond the separating tank; so it will be found advisable to put in one or two tanks like the first. The water will then flow from No. 1 into No. 2, and thence into the drain or No. 3.

If the separator is kept at a temperature of 160°, almost all the tar will separate from the water; and scarcely a trace of water will be in the tar in the bottom of the separator. Between the tar and water will be found an emulsion of tar and water 12 inches or more thick; and in draining off the tar, care must be taken not to let the emulsion come with it. After water shows at a test-cock 18 inches above the bottom of the separator, no more tar should be drawn. Attempts have been made to take advantage of the difference in gravity between tar and water to make an automatic overflow, but so far with indifferent success.

The best way to control the temperature of the separator is by controlling the temperature of the entering water. If part of the condenser water is used in the scrubbers and washers, and the rest for the boilers or some other purpose, there is no difficulty in properly cooling the gas, and at the same time keeping the separator at 160° Fahr. No more water is needed in the washer than is necessary to keep it sealed. If possible, the hot water from the scrubbers should be used for the washers; otherwise the warm water from the condensers. Very little, if any, water is needed in the scrubbers, and this can be had warm from the condensers. By exercising a little care, the waste water from the apparatus can be delivered at the separator at 170° to 180° Fahr. In case the apparatus cannot be so operated as to keep the waste water hot, the separator can be kept warm by a small coil of pipe in the bottom, through which live or exhaust steam is forced. In the case of two or more separators in series, the steam will be needed only in the first one. It is well, in any case, to put the steam-coil into the bottom of the separator, as it can then be heated when the plant is started up after being shut down for some time. It is well to cool the overflow water, and use it again for scrubbing and washing, as it has in solution a large quantity of hydrocarbons, and its capacity for hydrocarbon vapours is thus diminished.

If there is any water in the tar, it can very easily be seen by running a little of it on a piece of common window-glass. If no water is present, the film is smooth and uniform; but if there is water, it shows in small globules through which light can be seen. Sometimes, in testing, small air bubbles, looking very much like water, will collect; but these can easily be broken and made to disappear.

Several years ago, when this subject was before the Association, Mr. David Douglas stated that he had been able to make a good and satisfactory varnish out of this tar. Beyond this, I know of no uses to which it has been put other than those for which coal tar is commonly employed. I have made a few experiments with it, but have never had the time necessary to push them far.

## INCLINED RETORTS UP TO DATE.

Mr. F. Egner, in the paper which we reproduced under this heading on the 10th inst., referred (p. 905) to a report which a specially elected Committee of the German Association of Gas and Water Engineers were to present to the Annual Meeting of the Association. This report, which forms a summary of Continental experiences with inclined retort-settings, has been printed in the "Journal für Gasbeleuchtung;" and the following is an abstract translation thereof:—

The gas-works at Altona, Berlin, Chemnitz, Dresden, Cassel, and Erdberg (Vienna) have settings of inclined retorts; and information was collected concerning their working. It may be said at the outset that inclined retorts require generator firing. The information obtained as to the temperature, draught, composition of gases, and the working results, point to the furnaces having generally fulfilled expectations; but the information at the Committee's disposal was too meagre for anything more precise to be stated at present. The results obtained from the settings at Chemnitz have been so favourable that several more similar settings are to be put in shortly. The same might be said of Cassel; but there there is already a surplus of retort-benches. At Dresden, it had previously been determined to build settings of inclined retorts whenever new ones were needed; and last year ten such settings were erected. These answered well, and fulfilled the expectations which the work of the earlier settings there had raised. In Berlin, inclined retort-settings erected in 1891 and 1894 proved unsatisfactory; but various structural alterations have now been made, and the result is that it is known on what lines further alterations which are still necessary will have to be carried out. At Vienna, ten new settings have been built during the past year. This is sufficient proof that those previously in use have been satisfactory. At Altona, a new works has been provided exclusively with inclined retorts; but as gas making was only started there in May last, the results so far obtained have not been made known.

The Committee at present can only make this preliminary report, as there are yet very many points on which further light is needed. They would, they say, like to collect and compare large numbers of figures on the working results, the temperatures, the generator and spent gases, and the air supply of the settings. They would also like to further consider the best disposition of the settings in the retort-house, and the relative position of the latter to the coal-stores; the height of the house, and the clear space before and behind the benches; the height of the bottom tier of retorts, their length and shape, and the angle at which they are set; the proper position for the ascension-pipe; and the charging arrangements. For defraying the expenses of such an exhaustive investigation, the Committee estimated that a sum of 1000 marks (£50) would be needed; and they moved that this sum should be placed at their disposal. The grant, it may be mentioned, was made by the Association at their annual meeting.

## THE INFLUENCE OF FOREIGN OXIDES ON THE LIGHTING POWER OF THORIUM MANTLES.

Dr. G. P. Drossbach contributes to the "Gastechniker" an interesting article on this subject, from which we excerpt the following:—

The oxides known to have the power of emitting light have all been included in the Welsbach specifications; and only the oxides of the heavy metals have been left free. Inventors subsequently patented the employment of many of these for lighting purposes. The light-emitting power of the rare earths having been pointed out by Berzelius, the Welsbach patents clearly only extended to the particular mixture of the rare earths cited. The application of yttrium, thorium, &c., in conjunction with chromium, manganese, zinc, &c., for the manufacture of mantles does not infringe these patents. English and American patents were granted for such mixtures; and the German Patent Bureau on Sept. 27, 1890, passed a specification covering the use of most of the rare metals in conjunction with oxides of chromium and cobalt, copper, manganese, nickel, and tungsten. It is clear, therefore, that the use of such combinations does not infringe the Welsbach patents; and the question now is whether, by the aid of the heavy metals, it is possible to produce mantles which are either more effective in emitting light or less costly than the present ones.

The remaining heavy metals and the alkaline earths were also used in experiments on this question. In a blowpipe flame, the light-emitting value of the separate oxides was found to be proportional to the formula—

$$\frac{\text{Molecular weight} \times \text{specific gravity}}{\text{Specific heat}}.$$

At first only negative results were obtained with the heavy metals, as the oxides were gradually reduced and vaporized in the flame. Zinc oxide in the ordinary bunsen flame gives an intense greenish-yellow light; but it is gradually vaporized as the metal. Molybdenum, tungsten, nickel, and manganese oxides give little light, and are reduced. The conditions alter if refractory oxides are introduced into the mantle with the reducible ones. The refractory oxides behave as bases towards them, or allow of the formation of more or less acid salts. In the first instance, chromium, molybdenum, titanium, niobium, and tungsten give considerably better results in combination with lime, strontia, baryta and zinc oxide, and even better still with thorium oxide or all those oxides which have a high molecular weight. This is also a reason why the rare earths cannot be completely discarded. Chromium, titanium, tungsten on the one side give with thorium (traces of cerium), strontium, calcium, or zinc on the other side, a mantle not inferior to the Welsbach, possessing the advantage of greater cheapness, and producing a whiter light. It is evident that these metallic oxides act peculiarly, as a brown mantle containing lanthanum is made quite white by them. This is a proof that the lanthanum enacts another part in these mantles, and is no longer combined with the thorium oxide. As the solutions of the salts of the metals named give insoluble precipitates with the thorium salts, they cannot be added as such to the impregnating fluid. Therefore the cleansed cotton web is first steeped in the solution of the metallic salts; then pressed and dried in the ordinary way. The mantles so prepared are then further treated in the usual manner with the thorium solution.

One important point may be noticed. The mantles now sold contain 5 to 7 centigrammes of ash; and, ready for use, they weigh scarcely more than 50 centigrammes. In the ash, therefore, are found foreign bodies—silica, alumina, ferric oxide, &c. —to the extent of 10 to 14 per cent. of the mantle; and it will be understood that the illuminating value and durability of the mantle are affected thereby. To lessen the ash, the web should be extracted with 2½ to 5 per cent. hydrofluoric acid in the first instance. After pressing, or passing through a hydro-extractor, the web is brought into the first impregnating fluid. The proportion of acid to basic oxides must be such that acid or neutral precipitates are always formed, and not basic ones. The acid oxides are combined in the first fluid, and thorium, zinc, and the other basic oxides, in the fluid, used for the second dipping. This course appears, therefore, to furnish a working method which does not infringe the Welsbach patents.

**Gas-Aided Fires.**—Sir Henry Trueman Wood, the Secretary of the Society of Arts, has borne testimony to the convenience of the Siemens fire, which has lately been the subject of correspondence in "Nature." He has had one in his office for some years—in fact, since about 1880 or 1881. It was put in under Sir William Siemens's own superintendence; and for a long time it was used with coke in the manner he intended. But practically it has been found more convenient to employ ordinary coal, though it is less economical. Dr. Pole, in his letter on the subject noticed in the "JOURNAL" for the 3rd inst., emphasized the advantage of having gas ready to be turned on whenever the fire burnt low or went out. Sir Henry Wood remarks upon the utility of having a few gas-jets fitted to an ordinary grate; thereby saving trouble in lighting. The grate is simply filled with coal, and the gas turned on and lighted; and he says the fire burns up at least as rapidly as when it is started in the ordinary way.

# CORRESPONDENCE.

[*We are not responsible for the opinions expressed by correspondents.*

### The Position of the Sulphate of Ammonia Market.

SIR,—My attention has been drawn to the returns given by Mr. Price in the table of annual totals of sulphate of ammonia in his valuable paper on "The Residuals Market" read at the recent meeting of the Southern District Association; and I notice that they do not, unfortunately, as they could not, include the current year. If Mr. Price had been able to include the exports, even up to date, he would have been able to show that there is a very large increase in the exports of sulphate of ammonia, increasing, I think it will be seen, quite as fast as the production; so that this would not give quite so gloomy a prospect for the sulphate of ammonia market as Mr. Price's tables do. If the export trade increases as fast as the production, and there is some slight increase in the home consumption, the prospect will certainly be brighter.

*South Metropolitan Gas Company, Nov. 21, 1896.* FRANK LIVESEY.

### Pushing the Sale of Coke.

SIR,—I have read with much interest the discussion on Mr. W. E. Price's paper on "The Residuals Market," reported in your issue of the 17th inst., especially that portion relating to coke. In Sheffield, although there are a good many manufacturers who use coke, we are subjected to considerable opposition on the part of colliery owners and others, who lay themselves out to make various qualities of coke to suit the requirements of the manufacturers; and the Gas Company have always—except in times of very good trade—a surplus quantity to be got rid of. With cheap coal, the prospect of inducing householders to use coke did not look promising. We have, however, succeeded in doing so, almost beyond my expectation; and I am sure the value of coke as a fuel only needs to be more largely known to assure its appreciation. My own experience is that for kitchen ranges there is nothing equal to it. The flues do not get choked with soot as they do when coal is used; and bath and lavatory water is more easily kept hot.

For some years past, we have regularly sent out the enclosed circular with the Michaelmas and Christmas accounts. At first the number of orders received was disappointing; and it struck me that the reason for this might possibly be because the circular did not reach the hands of the head of the family. I therefore, about three years ago, had it gummed at the corner, and attached to the gas bills. The result proved my surmise to be correct.

Latterly, we have taken to delivering as small a quantity as 10 cwt. at half the price charged for a ton; so many people fill their cellars with coal in the autumn, and have very little room for coke. This has also increased our sales. We have just sent out 1082 bills for coke delivered in October for household use only; and these are in addition to a large number of cash payments. Many people, however, prefer a little credit; and we do not find that we lose much by bad debts.

If any of your readers should feel inclined to adopt our plan, I should like to give them a word of advice, which is to send out the same circular persistently, year after year, in good as well as in bad times. My experience is that spasmodic advertising is of very little use.

*Sheffield United Gas Company, Nov. 20, 1896.* HANBURY THOMAS.

[ENCLOSURE]

SPECIAL NOTICE—GAS COKE.

THE SHEFFIELD UNITED GASLIGHT COMPANY will deliver COKE, 10 cwt. and upwards, at your address, until further notice, at — per ton, or broken to the size of apples, at — per ton.

GAS COKE is an economical Fuel for greenhouses, kitchen fires, &c. It also burns well in any grate, mixed with small coal. Accumulations of slack can be disposed of in no way so well as by the aid of coke, and that, too, without loss of comfort or convenience. The fire should be lighted in the usual manner with wood and coal, after which coke should be added and covered with a layer of damp slack. All that is required to ensure a good bright fire is to stir out the bottom of the grate thoroughly about twice a day. Orders given to any of the Company's officials, or sent by post card, will receive immediate attention. Stoves, specially constructed for burning gas coke in warehouses, &c., can be had at moderate prices at the Company's offices.

### Use of Sea Water in Gas-Works.

A correspondent would be glad if any of our readers could inform him if salt water is ever used for the scrubbers and washers in gas-works at the seaside, and what are the results. He is specially desirous of finding out whether the water affects the ironwork of the plant, and whether the solid matters give rise to trouble in the distillation of the liquor.

### A Curious Question affecting the Laying of Gas Service-Pipes through Private Land.

A "Country Gas Manager" writes: Will you kindly allow me to ask, through the medium of the "JOURNAL," if any of your readers can give information on the following case: A certain village is supplied with gas through an old main, which has become too small for the purpose; so a larger one is being substituted. A consumer is at present supplied from the old main; but owing to certain alterations which he is going to make, and which will affect our pipes, we thought it better to lay the new pipe in another direction. So that, unless this consumer will be at the cost of laying a long service-pipe through his private land, he will be deprived of a supply of gas. Now the question arises: Will the gas company, under these circumstances, be liable for damages if they cut off the supply of gas, or will the company be compelled to lay a new service-pipe on private ground in order to keep him supplied with gas?

# LEGAL INTELLIGENCE.

## HIGH COURT OF JUSTICE—CHANCERY DIVISION.

### Friday, Nov. 20.

(*Before Mr. Justice* ROMER.)

**The Incandescent Gas-Light Company, Limited, v. The Meteor Incandescent Lighting Company, Limited.**

This was an action brought by the plaintiffs against the defendants for infringement of their patents.

Mr. FLETCHER MOULTON, Q.C., Mr. TERRELL, Q.C., and Mr. WALTER appeared for the plaintiffs. There was no one in attendance on behalf of the defendants.

Mr. TERRELL said nobody appeared for the defendants; but he must prove the case, as it was very important to the plaintiffs to get judgment upon it, in order that they might stop the enormous number of infringements by importers of mantles from Germany.

Justice ROMER suggested that if the defendants did not appear, the plaintiffs need only put in their patent.

Mr. TERRELL said: The question which will arise in this case is whether any mantle which contains the rare earth thorium is an infringement of the plaintiff Company's two patents. The invention which was made by Welsbach in 1885 was for an improved illuminant appliance; and the way in which he made his illuminant appliance was briefly this: He knew, and for many years had experimented upon, the properties of the rare earths to incandesce and to evolve the force which was transmitted to them by means of heat, in the form of the higher vibrations which are called light. He knew, and he had experimented for many years upon, these properties; but what he was aiming at was to make the property useful as a practical illuminant appliance. He found that, if you take a soluble salt of one of these earths, or mixtures of these earths, and if you soak vegetable fibre in it, the fibre absorbs from the solution a certain quantity of the salt of the rare earth; and then, having got in this way the structure of the fibre, he burns out the fibre, decomposes at the same time the salt, and leaves the rare earth in the structural form of the fibre in which it was impregnated—very finely attenuated, but brought into a condition which, when it is presented to the flame of a bunsen burner, evolves the heat which is transmitted to it by the burner in the form of light. This was a very great departure in the art of illuminating appliances; and at once it began to be very extensively used. Big companies were formed in different countries to adopt it; and at the present day the invention threatens to rival the electric light. Subsequently to taking out his patent of 1885, in which he described the structure and the use of certain of the rare earths, Welsbach continued his investigations; and he found that other rare earths were better than, or as good as, those which he had mentioned in his specification of 1885. In 1886, he applied for a patent for the improvements which he had made. The patent of 1885 was the subject of very extensive litigation before Mr. Justice Wills, who pronounced upon it two very important judgments. One judgment was supported in the Court of Appeal in language which I think is sufficient to carry us right through in this case. One of the two cases which came before Mr. Justice Wills for trial was that of the *Incandescent Gas-Light Company v. Sunlight Company*, and the other was the *Incandescent Gas-Light Company v. De Mare Company*. Mr. Justice Wills felt that he could not altogether discard the words in the specification, "the substances mentioned," and that he must treat it as being the substances mentioned, or equivalents of the substances mentioned. So while in the Sunlight case they had used totally different substances, he held that there was no infringement; but in the De Mare case, where they had used rare earths, he held that there was infringement. The De Mare case being taken to the Court of Appeal, the Court said this: The real substance of the invention is the application of the rare earths—the finding out how to make this delicate fabric of oxide coherent, and able to resist the flame. The Court of Appeal went farther even than Mr. Justice Wills had gone; and, from the judgment of the Court of Appeal, if the other case had been appealed, probably it would have been held that there had been infringement there also. But, at any rate, there is no doubt about one thing—that the mantle which was held not to be an infringement was practically commercially useless, and that it was not a serious competitor of the invention as described by Welsbach, seeing the class of substances which Welsbach used. Then there came the second patent, No. 3592 of 1886, the specification of which says (at line 10): "The said Carl Auer von Welsbach continuing his researches since filing the provisional specification No. 15,286 of 1885, has found that certain substances other than those mentioned therein can be advantageously employed in producing such illuminant appliances. For making an illuminant cap or hood to produce, when heated, a white light, the following substances may be used: 1. Pure thorium oxide makes a hood which is rigid when incandescent. 2. A mixture of thorium oxide about three parts with two parts of magnesia makes a hood which is flexible when incandescent." And then he goes on right through, giving certain prescriptions, in every one of which thorium oxide takes a prominent part. Before the date of this invention, thorium oxide was one of the rarest of the rare earths. Probably not many ounces of it had ever been obtained in the whole world. It was so rare as to be almost considered an impracticable thing to apply to an illuminant appliance. But when this specification pointed to the use of thorium oxide, and the immense advantage which was derived from it as an illuminant appliance, people began to work to discover new sources of thorium oxide, until now it is obtained in very large quantities, and is manufactured from the very minerals mentioned in the specification of 1885. Then, after all these prescriptions, the patentee comes to his claim; and he described how he impregnates the fibre very much as he did in the 1885 specification. Then (on page 4) he claims: "In hoods prepared as illuminant appliances for burners, the use of oxide of thorium alone or in admixture with oxides of zirconium, lanthanum, yttrium, neodymium, erbium, magnesium, or aluminium, substantially as herein described." Now, my Lord, the infringing Company have manufactured and sold (or imported and sold, which is the same thing as far as the patent law is concerned) mantles composed as follows: Thorium oxide, 29 per cent.; zirconia, 44 per cent.; lime, 19 per cent.; ceria with alumina and ferric oxide, about 8 per cent. Your Lordship will understand that the process in the manufacture of these mantles is such that you may get different mantles of slightly different chemical composition. This analysis which I am putting before your Lordship is an analysis made by Professor Dewar, Professor Swinburne, and Mr. Dugald Clerk together; and it is, I think, an analysis upon which your Lordship can place absolute reliance. We can prove that the mantle was bought from, and that it is a mantle which was manufactured and sold by, the defendants. But the importance of this case is to establish that, whenever a man makes a mantle in which he uses a rare earth at all, he is infringing (in accordance with the decision of the Court of Appeal) the 1885 patent; and if he uses the particular rare earth thoria, which was first applied by Von Welsbach in his 1886 provisional specification, then that he infringes the improvement which is contained in the 1886 patent. I think, my Lord, that you will be satisfied of that; and, if so, I shall ask your Lordship to so hold, and give us the injunction which we claim.

Professor *James Dewar* was then called. He said he had made a special study of the rare earths. One property common to them all was that the oxides were not volatile; that they were not reducible by carbon or by the reducing gases that existed in a flame; and that they all had, more or less, a high emissive power for light. The invention described in the 1886 specification was the addition of the rarest of the rare earths at that time—thoria—to the group already specified. Though chemists were fairly familiar with the cerite and ytterite groups of rare earths, he questioned very much whether there was an ounce of thoria to be met with in all the chemical laboratories in the world. The process adopted for the preparation of the mantle in the 1886 specification was exactly the same as in that of 1885. The use of oxide of thorium for the purpose of an incandescent mantle was not only useful, but was by far the grandest discovery Welsbach had made. In concert with Messrs. Swinburne and Dugald Clerk, he had made an analysis of a mantle handed to him by Mr. Gutch; the figures being those already given by Mr. Terrell. He had no doubt that the Welsbach process had been followed in the manufacture of the mantle. In his opinion, the function of the lime in this mantle was simply as an equivalent for the magnesia described by Welsbach. It would only be temporary, because lime was volatile at the degree of heat employed with these mantles. The illuminating power was due to the substances mentioned in Welsbach's specifications—that is thoria and zirconia.

Mr. *George A. Gutch*, the Assistant-Manager to the plaintiff Company, and two other witnesses, having proved the purchase from the defendants of the mantle handed to Professor Dewar for analysis,

Justice ROMER said it appeared that the defendants had infringed, and the plaintiffs were entitled to the usual relief—an injunction and an inquiry as to damages. The certificates of the former trials being put in, the plaintiffs were entitled to costs as between solicitor and client.

### Saturday, Nov. 21.

(*Before Mr. Justice* CHITTY.)

**Incandescent Gas-Light Company, Limited, v. Morrowitz.**

This case came on, as a short cause, upon motion for judgment in default of defence. The statement of claim set forth that the defendant had infringed the plaintiffs' patents of 1885, 1886, and 1893; and it claimed an injunction restraining further infringement, delivery up of the infringing articles, an inquiry as to damages, and payment of costs as between solicitor and client up to and including judgment.

Mr. WALTER appeared for the plaintiffs.

Justice CHITTY granted the relief prayed, and gave liberty to apply in Chambers as to payment of damages and subsequent costs.

### Robbery from the Birmingham Corporation Gas Department.

At the Aston Police Court yesterday week, Joseph Knight, a gas-fitter, was charged with stealing, between July 22 and Nov. 14, 40 brass unions, 54 gas-burners, 2 gross of screws, 8 candles, 14 wood blocks, 30 lbs. of scrap lead, and 9 lbs. of candles, the property of the Gas Department of the Birmingham Corporation. Prisoner was in the employ of the Corporation; and, from time to time during the past few months, he had been in the habit of taking to his lodgings small quantities of brass and metal belonging to his employers. His landlady on two or three occasions threatened to inform the Gas Department. Eventually she did so; and this led to prisoner's arrest. Evidence was given by Mr. S. R. Barratt, Fittings Superintendent of the Department, who said prisoner had been in the employ of the Corporation for about six months. It was his duty, when he went to a job, to get from the store what he required, and return the remainder. Unless there was a dispute, no one checked the articles or saw that they were returned; but they ought to be accounted for in the record of the work done. Prisoner had no authority to retain any articles, and had no right to appropriate any of the scrap. The Magistrates' Clerk (Mr. J. Rowlands): Do you consider that the method of checking is satisfactory? Witness: Yes. Mr. Rowlands: In view of the present illustration? Witness: The men ought to return the material not used. Mr. Rowlands: Yes; but you assume you have no rogues in the employ of the Corporation. In answer to the charge, prisoner admitted that the goods belonged to the Corporation; and he had retained them to make up for property which he had bought at different times. There was a previous conviction against the prisoner, who was committed for trial at the assizes. Mr. Wills (the Chairman of the Bench) said he regretted there should be such laxity in the method of checking adopted by the Gas Department. It was, no doubt, a great temptation for men to be dishonest.

**The Slough District Council and the Water-Works.**—The Slough District Council have instructed the Drainage and Water Supply Committee to consider, and report in three months, as to the advisability of acquiring the water-works supplying the town.

# MISCELLANEOUS NEWS.

## SOUTH METROPOLITAN GAS COMPANY.

### Proposed Alteration in the Qualification for a Director.

Among the notices given for Private Bills to be submitted to Parliament on the ensuing session, a complete list of which will appear in the "JOURNAL" in due course, is one by the South Metropolitan Gas Company, who are desirous of amending the Act recently obtained by them so as to alter the qualification for a seat at the Board. It is proposed to alter section 15 and sub-section 6 of section 19, which bear upon this matter. The first-named section stands as follows: "The qualification for a Director other than a Director elected by the employees of the Company shall be the possession of paid-up stock of the nominal value of £5000." Sub-section 6 of section 19 states that "the qualification of an employees' Director shall be fixed by the scheme for the time being, subject to the following limitations: The employees' Director shall have been not less than seven years in the constant employ of the Company, and shall have held for not less than 12 months prior to the date of election, and shall continue to hold, not less than £250 nominal value of the ordinary stock of the Company." The notice specifies that the Bill to be applied for will "repeal, alter, and amend all such rights and privileges as would interfere with any of its objects, and will confer other rights and privileges, and will repeal, alter, and amend such of the provisions as may be thought necessary or expedient of the Act and any other Act or Acts relating directly or indirectly to the Company or their undertaking; and it will or may incorporate with itself, *in extenso* or by reference, with or without alteration, such of the provisions as may be deemed expedient of the Companies' Clauses Consolidation Act, 1845."

## THE WATER-GAS PLANT FOR BIRMINGHAM.

The commencement of the supply of water gas in Birmingham has influenced the "Daily Post" published in that city to give its readers some general information concerning the manufacture of water gas, and a few particulars as to the plant which is being put down by the Economical Gas Apparatus Company, Limited, at the Windsor Street and Saltley gas-works of the Corporation. It is expected that the contract will be completed next month; but half the producing plant at the first-named station is already available, and has been in partial operation for some days past. When the duplicate plant at Windsor Street is in full work, it should yield 2 million cubic feet of gas per day of 24 hours, or about a quarter to a fifth of the average output of the station; while the further extension, for which room is provided, will bring up the capacity to a third of the output. A similar proportion will hold good in connection with the installation at Saltley. The labour employed for the double service now being laid down at each works will be five men for each eight-hour shift, or fifteen men in all for 24 hours, with the addition of two men an hour per day to do the clinkering. The cost of this for a plant of 2 million cubic feet of gas per day is less than an eighth of what would be required to attend to coal carbonizing plant of corresponding capacity. The tank for storing the oil at Windsor Street is a cylindrical vessel 60 feet in diameter and 25 feet high, and will contain upwards of 400,000 gallons of oil, or about enough for the winter six months' use. It is understood that the cost of the present installations will be within the estimate of £60,000 originally given; and this compares with an outlay of £130,000 which would have been involved had coal-gas plant to be provided of equal capacity.

## LEEDS CORPORATION GAS SUPPLY.

### Half-Yearly Accounts—The Justices and the Illuminating Power of the Gas.

The Leeds Corporation Gas Committee, at their meeting on Thursday, had before them a statement of the revenue of their department for the half year ending June 30. It showed that the surplus profit amounts to £3528, as compared with £13,215 for the corresponding period of 1895, or a decrease of £9687. The explanation of this great difference between the two half years is the fact that on Jan. 1 last the price of gas was reduced 2d. per 1000 cubic feet—from 2s. 4d. to 2s. 2d. It was then calculated that the reduction would mean a loss of revenue of £19,000 per annum; and the first half of the year proves the accuracy of this estimate. The actual decreased income from the sale of gas (after allowing for discounts and leakage) for the six months is £10,135. Then £5190 less has been received from the sale of residuals; while there is an increased expenditure of £2775 in regard to purification, distribution, repairs, interest, and sinking fund charges, &c. On the other hand, there is an additional income from gas-stoves of £52; and from old metal and carbon, of £407. The expenditure in respect of gas manufacture (including coals, wages, &c.) shows a decrease of £5621. Assuming that the price of gas had not been reduced in January, there would have been a profit of above £13,000, as was the case for the six months ended June, 1895. The profit of £3527 is, under all the circumstances, considered to be satisfactory by the Chairman and members of the Committee; and there is every hope that the current half year will turn out equally as favourable.

The Gas Justices of Leeds have called the attention of the Corporation Gas Committee to the "inferior quality" of the gas supplied for months past to the consumers. In their communication, the Justices remind the Committee of the numerous occasions on which the gas has been below the legal standard. In the case of the Sheepscar supply station, there have been sixty tests made during the six months; and on no fewer than forty-six occasions, the gas has been found below the standard 18-candle power. The attention of the Committee was especially invited to the fact that they had frequently undertaken to comply with the wishes of the Magistrates by maintaining the parliamentary minimum; and they were asked why it was that they had not carried out their own resolution, which they had sent to the Justices. In one instance, where a test was made, the quality was found to have fallen as low as 16·50-candle power. The letter from the Justices was considered at a meeting of the Committee on Thursday, when it was pointed out that, during the past two or three months, in consequence of certain alterations being made at the gas-works, the pressure of gas had not been what it ought to have been. This, it was stated, has now been remedied; and the Committee seem confident that no further complaints will be heard respecting the "wretched" quality of the city gas.

The report of the Magistrates' Inspector (Mr. C. Buckley) on the quality of the gas during the month ending Nov. 11, shows the illuminating power at the various testing-stations to have been as follows: York Street, 18·15 candles; Sheepscar, 17·59 candles; Kirkstall, 17·53 candles; Wortley, 17·75 candles; Dewsbury Road, 17·94 candles; average 17·79 candles. The tests made, on behalf of the Gas Committee, by Mr. T. Fairley at East Parade, gave the following results: With a standard 24-hole argand, 18·3 candles; and with a standard batswing, 18·6 candles. With regard to Mr. Buckley's average of 17·79 candles, the Gas Committee consider this is quite misleading, inasmuch as the Inspector takes into account not only his tests at the three gas-works, but also those made at the two outlying stations at Sheepscar and Kirkstall Road. The Committee's averages for the three works during the month are: York Street, 18·25 candles; New Wortley, 18·10 candles; and Dewsbury Road, 18·10 candles—average 18·20 candles. This shows that the gas now being manufactured is above the standard all round. As proof of the efforts which are being made by the Gas Committee to bring about an improvement in the quality of the gas, it may be mentioned that the quantity of cannel coal now being used is double what it was twelve months ago. In October, 1895, the percentage of cannel used was 9·7; while last month it was 20·5.

## WIDNES CORPORATION GAS AND WATER SUPPLY.

### The Disposal of the Profits.

As briefly mentioned in the "JOURNAL" last week, Mr. E. P. BURD, one of the Inspectors of the Local Government Board, held an inquiry at the Town Hall, Widnes, on the 11th inst., in regard to an application made by the Corporation for a Provisional Order, under section 303 of the Public Health Act, 1875, "to partially repeal, alter, or amend the Widnes Improvement Act, 1867, so far as the same provides for the application of the gas-works and water-works funds respectively in the payment off of the principal moneys secured by gas-works and water-works mortgages respectively, in addition to setting apart the respective sinking funds for payment off of the said mortgages."

The TOWN CLERK (Mr. H. S. Oppenheim) appeared for the Corporation; Mr. SQUAREY and Mr. BEWLEY, of Liverpool, represented the opponents of the application (the United Alkali Company, Messrs. W. Gossage and Sons, and Mr. Alderman F. H. Gossage, ex-Mayor).

The TOWN CLERK said the application was of a very simple character, and he would merely draw attention to the salient clauses in the Widnes Improvement Act of 1867, and to the particular section which it was proposed to amend. By section 88, it was directed that "the Local Board shall keep a separate and distinct account, to be called the gas-works account, of their receipts, credits, payments, and liabilities in relation to the execution of this Act with respect to gas, and for or on account of the charges for gas supplied under this Act; and those receipts and credits shall form their gas-works fund." The 89th section was in identical terms in regard to the water-works fund. The application of these funds was provided for in section 102. The gas-works fund was to be applied first in paying the interest on moneys secured by gas-works mortgages; secondly, for setting apart the sinking fund for discharging the mortgages; thirdly, for maintaining the works, and in other respects carrying the Act into execution with respect to gas (except enlargements and extensions); fourthly, for making these enlargements and extensions; fifthly, for repaying moneys advanced for purposes of the Act out of the general district rate, and not repaid; sixthly, for paying off principal moneys secured by the mortgages; lastly, the surplus was to be carried to the general district fund. The succeeding section dealt in a like manner with the water-works fund. It was with the sixth purpose that the Corporation asked the Local Government Board to deal. It might assist the Inspector to sketch the borrowing powers in respect to both undertakings. Under the Act of 1867, the capital allowed to be raised for gas purposes was £15,000; and, in addition, there was half the purchase-money, amounting to £8669. Under the General Acts, there was further power to borrow £4871. Under the Act of 1875, they were authorized to raise £30,000 more; and in 1879, a Provisional Order was obtained from the Local Government Board which sanctioned the raising of a further £40,000. The total authorized gas capital was, therefore, £98,540. For the water-works, under the Act of 1867 they could raise £25,000; there was half the purchase-money and costs, £8669; and under the General Sanitary Acts, £30,600. Under the Act of 1875 a further £70,000, and under the Provisional Order of 1879 a further £70,000, were authorized to be raised; making the total borrowing power for water-works purposes £204,269. The amount actually borrowed for gas was £70,239; and to this there had been an addition of £18,695, moneys provided out of surplus—making a total expenditure of £88,934. The amount that stood to the credit of the sinking fund at the present time was £11,676, which, if taken from the amount actually borrowed, left the debt on the gas-works at March, 1896, £58,563. With regard to water, the amount actually borrowed was £169,996. In addition there had been provided from the surplus £5073; making a total expenditure of £175,069. The sinking fund amounted to £29,034. Deducting this from the sum actually borrowed, left the debt on the water-works at March, 1896, £140,962. The sinking fund periods, which under the Act of 1867 were 30 years for gas and water, were altered by the Act of 1875 to 50 years; and for other money then borrowed the term was 60 years. By an order of the Local Government Board in 1886, £53,496 of the gas debt was consolidated, and a period of 45 years from

June 29, 1885, was fixed. With regard to water, £150,808 was ordered to be repaid within 47 years from the same date. An amount of £11,100 borrowed under the Provisional Order of 1879 for gas had to be repaid in 27 years. In May, 1895, the Council consolidated and paid off a considerable portion of their mortgage debt; and for this consolidated debt they had issued stock. The gas and water undertakings had been more or less of a profitable character. There had been times, in the early history, when the books showed a loss; but actual profits on the gas account, from the time the works became the property of the Local Authority in 1869 to March 25, 1896, had been £44,979. Deducting losses sustained in the years 1878, 1889, 1890, and 1891, £1711, the net profits were £43,268. This sum had been reduced by appropriations for the following purpose: For deficiencies in the general district rate at March, 1883, 1884, 1885, and 1892, £2689; public lighting, from 1892 to 1896 inclusive, £5861; reserve fund, £1500; extensions of works, £21,086—making a total of £31,136, and leaving a balance of profits in hand last March of £12,132. The profit earned by the water-works during the same period was £28,177. Adding the amount received from the general district fund, £5074, made a total of £33,191. Deducting the losses sustained from 1869 to 1896, £18,874, general district fund repaid, £4092; and extensions of water-works, £1124, there was left a balance of profits in hand last March of £9831. From this must also be deducted the amount appropriated towards the cost of the Netherley extension, £5073; and the net balance of the unappropriated profit then amounted to £4758. The profits were represented by large stocks and working capital, which was necessary to carry on the various businesses. Coming back to section 102, subsection 6, Mr. Oppenheim said it was an exceptional provision. After diligent inquiry, he had not been able to find any case of a similar character; and he did not see why Widnes should be saddled with restrictions that were not imposed upon other bodies. The capital debt was small in proportion to the value of the undertakings; and the prices of gas and water were more than moderate. Large consumers were supplied with gas at 1s. 8d., and ordinary consumers at 1s. 10d. per 1000 cubic feet net. For manufacturing purposes, water was supplied at 4½d. per 1000 gallons; and when customers took more than 40 million gallons a year, there was a reduction of 1d. When manufacturers were able to take more than 50 million gallons per annum, they received the water at the absurdly low price of 2d. per 1000 gallons, which was only sufficient to pay for the cost of pumping. These were great advantages to Widnes; and he could not point to one single circumstance of an exceptional character which should cause to be imposed upon the town the additional provision of paying off mortgages in addition to providing a sinking fund; in fact, the provision was practically obsolete, as it had never been acted upon. There had been no reduction of debt on gas or water account except by the ordinary course of the sinking fund. It was further inconvenient and unworkable, because the mortgages were for fixed terms. The creation of stock had absolutely disposed of £34,519 for gas and £10,665 for water. To this extent the mortgages had disappeared, and the stock would be wiped out by the ordinary process of a redemption fund. In the future, there would, no doubt, be further developments in the issue of stock; and when this took place, the larger amount of these mortgages would be relieved from the possibility of redemption under the existing clause, which it was sought to have excised.

Mr. *S. Hoyle*, the Borough Accountant, was called, and substantiated the figures given by the Town Clerk.

Mr. SQUAREY cross-examined witness to show that the mortgages could be repaid on the same principle as providing a sinking fund; and witness said he could not draw a distinction between mortgages and sinking fund. The public lighting cost about £1800 per annum; and he could not point to any statutory provision that put upon the gas undertaking the responsibility of paying for this service at Widnes. If public lighting were not paid for out of the gas profits, it would fall upon the general district rate. The cost was increasing each year.

Mr. *S. Owens*, the Chairman of the Finance Committee of the Corporation, said he had given the question of the disposal of the gas and water profits serious consideration; and, in his opinion, the clause quoted was not a reasonable restriction upon the liberty of action of the Town Council. After providing for the sinking fund and maintenance, any surplus should go to the general district rate. He was in favour of cheap gas and water; and there was no reason to anticipate any change in the policy of the Council if the existing provision were taken away. One of the first acts of the Council was to reduce the price of both gas and water; and this, he believed, would be their policy in the future.

By Mr. SQUAREY: In order to keep gas at the present low rate, it was essential that no further expense should be put upon its production. If the manufacturers obtained their gas and water at a price which was at once the envy and despair of neighbouring towns, and there was any profit left after fulfilling all legal obligations, he thought it was right and fair that the public—occupiers and residents of the town—should have the benefit of it. A Sub-Committee had considered this question; and a report thereon, which was submitted by the Town Clerk, was adopted with one dissentient. The subject came before the Council, and they settled it. Other towns applied the gas profits to the relief of the district rates; and he thought Widnes ought to be in the same position. The gas consumers would prevent the cost of the public lighting being defrayed from the gas profits if they could, because they pertinaciously objected to the proposal, after the gracious act of the Council in reducing the price of gas. The cost of public lighting would not materially increase in the future.

In answer to Mr. SHORES, witness said the Council would deal with the profits as they arose. The idea of the Finance Committee was that the profits should be devoted to some useful public purpose—the greatest good for the greatest number. He would not touch the accumulated profits.

Mr. SHORES said that Widnes had suffered enormously from absentee landlordism. There were 2760 houses owned by persons who resided outside the borough, and who did not use the Corporation gas. If he included those who resided outside, but consumed the gas for domestic purposes, the number would be more than 3000. Taking the rateable value of the 2760 houses at £9 each, the total would be nearly £25,000. Assuming that the cost of the public lighting were charged to the district rate, it would be equal to 3½d. in the pound; and by the cost being defrayed out of the gas profits, these absentee landlords, who did not contribute in any way to the success of the gas undertaking, were presented with £360 a year. It was intolerable that the incidence should fall as it did; and he ventured to suggest that the existing Act, unusual as it was, by placing the repayment of mortgages before taking the profits, had conduced greatly to the success of the gas undertaking. If the profits were put to the district rate, it would deprive the Gas Committee and their Engineer of a strong stimulus to maintain their present position as the cheapest gas producers in the United Kingdom, and would tend to extravagance on the part of the Corporation, and the using of the profits for various purposes without increasing the district rate. The tendency would also be to increase the price of gas; and if the works which took half of the gas consumed should be driven into the necessity of providing their own gas, the town would be left with a great white elephant in their splendid gas-works. The whole effect of the Act had been to fence off the gas profits, and to "save them from themselves." He therefore hoped the Inspector would find it consistent with his duty to recommend that the Act remain as it was.

Mr. *J. White* expressed the opinion that the profits made by the supply of gas and water should be employed in keeping down the prices of these commodities; this being, he said, a legitimate course to take. If the profits were otherwise applied, it would open an unbounded source of corruption.

Mr. *G. Davies* said the gas consumers benefited considerably from the property-owners, owing to the private improvements the latter were compelled to make at a cost averaging £10,000 to £15,000 a year.

Mr. *F. Hartland*, as a workman and a tenant, opposed an alteration of the present system, and said a question of so sweeping a character ought to have been submitted to the ratepayers for judgment. He contended that the whole of the tenants were in favour of the present system.

Mr. *W. Gibbings*, the Manager of the Liverpool Silver and Copper Company's works, stated that special facilities existed in Widnes for producing the electric light; and any increase in the price of gas would lead to its general adoption.

Alderman *Timmis*, the Chairman of the Gas and Water Committee, examined by Mr. SQUAREY, said that, if the price of gas were increased, Widnes would be injured; and, in his opinion, if this application were granted, the price of gas would be raised. It was to his mind a most improper thing to hand over the gas profits to the district fund without restriction. The Gas Committee never had an opportunity of considering the report on the question; and he thought that the subject was hurried. Since the vote was taken in the Council, several members had changed their opinions. A memorial had been signed by 784 ratepayers (himself among them) against the application.

The TOWN CLERK said he would leave it to the Inspector to determine how the memorial should be proved.

The INSPECTOR: My own impression is that these memorials are not worth the paper they are written upon.

Mr. SQUAREY said he did not quite agree with that; but he did not intend to call upon 784 gentlemen to ratify their signatures.

Alderman *Timmis*, in further examination, stated that he was largely interested in the firm of Messrs. Gossage and Sons, Limited, who were rated to the general district rate at £4232, and consumed 13½ million cubic feet of gas per annum. If the gas profits were placed to the district fund, there would be a tendency on the part of the Council, if there was a deficiency on the general district rate, to make up the difference out of the profits of the gas-works.

The TOWN CLERK said it was impossible to have a deficiency, as the Council had unlimited power in regard to the rate. He did not understand how there could be a deficiency.

The INSPECTOR explained that the witness meant that, if it were necessary to raise the general district rate from 2s. 6d. to 2s. 10d., the tendency would be to go to the gas profits for the odd 4d.; and he quite agreed with him.

*Witness* (continuing) said he considered it of great importance that the plant at the gas-works should be kept in a high degree of efficiency. At present this was done out of the profits. Without these, more capital would have to be borrowed, and thereby the standing charges would be increased. The present system was economical and efficient. Cheap gas and water was a great inducement to the present manufacturers to remain in Widnes, and to others to come to the town.

In cross-examination by the TOWN CLERK, witness maintained that, under the proposed alteration, the profits would be frittered away, and when there came an unprofitable year, or a coal strike, the price of gas would be raised.

The TOWN CLERK replied to this that there was no intention to alter the fourth provision in the section—that the gas works fund should be used for the enlargement and extension of the works.

*Witness*: On the face of it, I admit there is not.

The TOWN CLERK said the argument appeared to be that the consumers made the profits, and the profits being made by them, must go in reduction of the liability on the gas-works until the user had gas for nothing.

*Witness* said he could not imagine such a thing.

Mr. *A. Thorpe*, a member of the firm of Messrs. W. Gossage and Sons, said they used 133 million gallons of water per annum. To add 1d. to the district rate would cost his firm £17 to £18; and the same amount on the price of gas, at the present consumption, would mean £55. An increase of ½d. per 1000 gallons of water would amount to £278 a year. He agreed with Alderman Timmis as to the necessity for having cheap gas and water, and said that, since this matter was raised, the firm, which had already one electric installation, had seriously considered whether they should extend it to the whole of the works. They had power to draw water from the canal; and the question arose with them whether they should adopt some of the well-known processes of purifying, so as to make themselves independent of the town's supply. They had already been successful in economizing to the extent of 18 million gallons this year; thereby saving £300. In his opinion, the effect of the present proposal would inevitably be an increase in the price of gas and water.

Mr. *J. Morrison*, the District Manager of the United Alkali Company,

Limited, said the total quantity of gas consumed by the Company last year was 53 million cubic feet, which, at 1s. 8d. per 1000 feet, would cost £4500. The Company used 479 million gallons of water at an average cost of 4d. per 1000 gallons, which came to £8054. Most of the Company's works were contiguous; and the mains in them were the Company's property. They had considered the advisability of making their own gas since the present question was raised. They had an estimate that they could produce it at 1s. per 1000 cubic feet. If the Company made their own gas, it would be a distinct gain to them, and a loss to the Corporation and the ratepayers. The general feeling in Widnes was that the price of gas would go up.

In reply to the INSPECTOR, witness said his Company were in an exceptional position to produce cheap gas, because they would use all the bye-products themselves. They consumed more coke now than Widnes provided, and had to obtain it from all over the kingdom.

Alderman *Williamson* described the proceedings in Committee, stating that a long report prepared by the Town Clerk was read, and in an hour was rushed through and adopted. He pointed out how an increase in the price of gas would be a great loss to users of automatic prepayment meters, and to shopkeepers in a lesser degree.

Mr. *Isaac Carr*, Assoc.M.Inst.C.E., the Corporation Gas and Water Engineer, stated that the actual cost of production of gas at the works was 4½d. per 1000 cubic feet. Including the sinking fund and all other charges, but without the public lighting, the cost was 1s. 2½d.

The TOWN CLERK pointed out that Mr. Carr occupied a delicate position. There was, he said, certain information which should not be made public to other gas producers, and which Mr. Carr should keep to himself and his employers.

Mr. SQUAREY said he was not desirous that Mr Carr should divulge anything confidential. He then asked witness if it was possible to sell gas at a cheaper price than at present.

*Witness* replied in the affirmative.

Major *Lewis*, as representative of a landed estate—the Hutchinson Trustees—said the estate consisted of 250 acres; and unfortunately a large proportion of this area was still unlet. The chief inducement they had to offer to manufacturers to introduce new industries was cheap gas and water; and anything that interfered with this would be detrimental not only to the interests of the estate represented, but to the ratepayers generally.

Mr. SQUAREY then addressed the Inspector; recapitulating the facts and arguments used by the various witnesses against the application. He stated that the result of the proposed alteration would be that the consumers of gas would be taxed for the benefit of the ratepayers at large; that the gas profits would become a means of carrying out a variety of projects; and that the price of gas would be increased.

Mr. BEWLEY endorsed Mr. Squarey's remarks.

The TOWN CLERK then replied. He said the Council only asked for the elimination of the sixth paragraph in section 102; the provision of the sinking fund and the maintenance and extension of the works would still be a charge upon the profits. He contended that both the Committee and the Council had a full opportunity of discussing the proposal. He objected to the distinctions drawn between gas consumers and ratepayers. The gas and water undertakings were the property of the ratepayers as a whole, and one could not imagine that the representatives of the ratepayers would be guilty of such a suicidal policy as to destroy their own property. He knew no reason why there should be a change in the policy of supplying cheap gas and water, which were the life-spring of the borough. There was nothing in striking out this useless and obsolete provision that would interfere with it. Whatever surplus remained, after providing for the sinking fund, the maintenance of the gas-works, and other matters specified in the Act of Parliament, they wished to place in the general district fund; and they would deal with this fund as honest men ought to do. He thought the present a reasonable application, and he hoped it would be granted.

The inquiry then concluded.

## BLACKPOOL CORPORATION GAS SUPPLY.

### Proposed Extension of the Area.

A Local Government Board inquiry was recently held at Blackpool, by Mr. E. P. Burd, in regard to an application on the part of the Corporation for an extension of their present area of gas supply, so as to include the townships of Bispham and Carleton. Mr. W. J. Dickson opposed the application, on instructions from the Fylde District Council and the Parish Councils of Bispham and Carleton. The Town Clerk (Mr. T. Loftus) explained that the object of the Corporation was to extend in a northerly direction their area for the supply of gas; adding that the maximum price to be charged in the new district was not to exceed 4s. 6d. per 1000 cubic feet. Referring to the opposition raised to the application, he said it arose from a fear entertained by certain parties that there would be incorporation; but, so far as he knew, there were no proposals for an extension of the borough boundaries. Besides no one in the new area need have a supply of gas unless so disposed. Mr. J. Chew, the Corporation Gas Engineer, gave evidence showing that many people in the neighbourhood of the north boundary of the borough wanted gas. In cross-examination, he acknowledged that the Parish Councils concerned could make their own gas by adopting the Lighting and Watch Act. Replying to the Inspector, Mr. Chew said the works of the Corporation were able to supply the increased area without the erection of any additional manufacturing plant. The maximum make was now 30 million cubic feet a year; and he estimated that the houses in the new area would consume from 1¼ to 1½ millions—a quantity which could be made in a day. A number of witnesses were called in support of the application; and a larger number were brought up by the opponents. Included in the latter was a Dr. Hardman, who said that the oil-lamps now in use in the district gave satisfaction. Moreover, as a medical man, he preferred them to gas. Mr. Loftus, in reply, argued that the Parish Councils could not supply gas under the Lighting and Watch Act, which he said was practically obsolete. He also stated that the fear of incorporation was the real cause of the opposition; and he assured the Inspector that there was no sinister motive whatever in the application of the Corporation.

## THE GAS QUESTION IN VIENNA.

"Der Gastechniker" of the 15th inst. states that the Vienna Town Council are taking active steps for the erection of new gas-works. The constructing department has been put in charge of Engineer H. Kapaun. The marking out and levelling of the ground for the works have already been taken in hand; and, further, preparations are being made for laying mains. Notwithstanding these evidences of the determination of the Council, our Vienna contemporary expresses doubt whether new works will actually be built.

The legal opinion sought by the Common Council has only lately been made public. Dr. Leopold Pfaff, Professor of Austrian Civil Law in the University of Vienna, and Dr. Adolph Exner, were asked to state an opinion on the following questions:—

1.—Does the incorporation of the suburban communes with Vienna annul the contracts entered into between them and the Imperial Continental Gas Association?

2.—Do the contracts with the suburban communes in any case expire when the contract with the city terminates—viz., on Oct. 31, 1899?

After a lengthy argument on the legal aspect of these questions, the first is answered by the attorneys in the affirmative; and the second therefore does not need a separate reply. The importance of the opinion lies in the fact that the Imperial Continental Gas Association have made contracts with suburban communes at various times before their incorporation with the city, and that many of them do not expire with the city contract. The above opinion was asked some months ago; but the text has not been published until quite recently. It was a potent factor in persuading the Municipal Council to favourably regard the project for building new gas-works.

## ORIENTAL GAS COMPANY, LIMITED.

The Ordinary General Meeting of this Company was held last Wednesday, at the London Offices, Finsbury House, Blomfield Street, E.C.—Mr. J. BLACKET GILL in the chair.

The SECRETARY (Mr. H. J. Luff) read the notice convening the meeting; and it was agreed to take as read the Directors' report and the accounts for the year to June 30, of which an epitome appeared in the "JOURNAL" last week (p. 980).

The CHAIRMAN said those shareholders who had carefully perused the accounts would, he thought, consider with the Board they were fairly satisfactory. They showed that in the past year there had been an increase of 2·7 per cent., as against 1·9 per cent. in the previous twelve months. Coal had cost them £2000 more; but they were reimbursed by the rental, as that was £2000 in excess. They had fixed an additional 158 public lamps; and 180 new consumers had been connected with the mains. The residuals and fittings had given them £1600 more; and the shareholders would also notice this agreeable feature—that the exchange was £2750 better, though the amount still remained at the startling figure of £26,170. One of the most gratifying points in the accounts was that the Directors had been enabled to pay off a further £9000 from the debenture debt, and thus save nearly £400 a year in interest. They had also been able to add £2000 to the reserve and depreciation account, and to suggest that the same dividend as last year should be declared—viz., 8 per cent. They would then have £19,541 to carry forward, as against £18,451 last year. The Directors had determined, as exchange had been more favourable, to open an exchange equalization account; and he believed the shareholders would agree with him that this was a very wise step to take. He hoped next year they would find exchange had still further improved; but, if not, they would have something to fall back upon. He had been comparing the present accounts with those of ten years ago; and he found that their debenture loans were no less than £45,000 (before that they were even more); and now they stood at £13,450. While they had been gradually strengthening the position of the Company and paying good dividends, it was most satisfactory to know they had been cutting off so much of their heavy debt. The rentals and residuals ten years ago produced £80,000, as against about £99,000 now. Unfortunately, exchange had grown in the ten years from £12,600 to upwards of £26,000; and this, of course, was an awkward feature. The Indian income-tax was first imposed ten years ago. It did seem to the Directors rather hard that they should have to pay income-tax in both countries; amounting together to the tremendous sum of £2000. Their great bar to progress had all along been the debased and ever-depreciating rupee. People did say it was going to be better. He hoped it would be; but he would not prophesy, because he did not know. The Directors were informed that there were going to be considerable railway extensions at Howrah, which would increase the traffic, and the Railway Company would become large consumers of gas. He had also heard that some extensive mercantile buildings were being erected in Calcutta, which would also consume gas. The shareholders would, however, be sorry to hear that the electricians had been making great efforts to open their industry in Calcutta. It had always been somewhat astonishing to him that electricity had not made more progress than it had in India; but he believed the wires must always be above ground, as he understood that climatic influences prevented them being put in underground mains. The electricians had entered into a contract with the Tramway Company. The tramways had never been a great success; and it remained to be seen whether the electricians could make a fair profit where the Tramway Company had been unsuccessful. The unfortunate part of the matter was that they would be looking about for opportunities of using their power for other purposes than tramways; but the Gas Company had one very powerful weapon to counteract the use of electricity—that was the incandescent gas-light, which they would endeavour to push as far as they could. He was sure the proprietors would be pleased to hear that their Manager (Mr. D. C. Niven) had made arrangements by which the Company were practically the agents for

the light there; and they would reap great benefit from it—they would be enabled to give a better light, and would obtain corresponding advantages. He was certain the proprietors, connected as they were with India, must have heard with great regret of the unfortunate famine there. It had always struck him as strange that, while this country seemed to be so ready to send its money to all sorts and conditions of people in other parts of the globe, they never appeared to have a national subscription for their poor fellow Indian subjects. He had no doubt some of the proprietors had read, in that day's papers, the interesting address by Lord George Hamilton on the subject, and had seen that he intimated that possibly an opportunity would be afforded for aiding the Government by private and public subscription. A body who took money from India as they did, would be only too glad to assist in such a laudable object. He was sorry to tell the shareholders that the engagement of Mr. Bertram Ellis with the Company, which was for five years, was about to expire, and that they had been unable to renew his appointment as Assistant Manager, from the fact that he had not enjoyed very good health in India. Under the circumstances, he was leaving them. During the years Mr. Ellis had served them, he had striven his very best to promote their interests in every way; and the Directors would be only too glad to do what they could to promote his interests when he returned to this country. They had taken great pains to secure a good successor to Mr. Ellis; and they had made an arrangement with Mr. J. C. Watson, who had occupied a similar position in a Suburban Gas Company for many years, to take his place. He came to them with very high credentials indeed from representative gas men; and he believed the Directors had made a good choice of an assistant for their Engineer. Mr. Niven reported that the works had been well maintained, and everything was in thorough order. They had a considerable amount of anxiety some short time since when their chief gasholder came to grief; but it had been put in good condition under Mr. Niven's superintendence. This one instance showed how very essential it was that they should have a practical engineer on their works, like Mr. Niven, who, he was certain, had striven for many years past, and was striving still, to promote the interests of the Company to the best of his power. The Chairman concluded by moving the adoption of the report and accounts.

Mr. N. E. B. Garey seconded the motion.

Mr. S. Spencer remarked that he was glad to hear the Company were developing the lighting business by incandescent gas-lamps; and he asked whether the Directors were contemplating entering into a contract with the Government.

The Chairman replied that their agreement did not run out till 1901; and the Board had not taken any steps since the previous meeting.

The motion was carried unanimously.

The Chairman then moved the declaration of a dividend of 8 per cent. for the twelve months ending June 30 last, less the interim payment of 3½ per cent.

The motion was seconded by Mr. R. Hesketh Jones, and was unanimously adopted.

On the proposition of Mr. H. D. Ellis, seconded by Mr. R. Miller, the retiring Directors (Messrs. J. B. Gill and R. H. Jones) were re-elected; and on the motion of Mr. Spencer, seconded by Mr. Whitley, the shareholders agreed to the re-appointment of Messrs. A. T. Eastman and S. W. Savage as Auditors.

Mr. Eastman then moved a vote of thanks to the Chairman and Directors for the successful efforts they continued to make in the interests of the shareholders. In doing so, he said that, judging from the report and balance-sheet, he felt convinced the shareholders had all arrived at the same conclusion as himself, that the concern was very rapidly increasing in its general stability. It was always highly satisfactory to get rid of debt; and the rapid strides the Directors had been taking in extinguishing the debenture debt must be very gratifying to the shareholders. He saw that only two years ago—June, 1894—the debenture debt was more than double what it was at the present time; and it appeared to him to be quickly approaching a vanishing point. Referring to remarks that had been made on previous occasions to the effect that it was a pity the reserve account was not invested in Consols or some other gilt-edged security, he thought the shareholders would agree with him that it was much better to use the reserve account in extinguishing their indebtedness, because that had to be faced in any case; and, in the event of the liquidation of the Company, they would have to sell the Consols to pay off the debentures.

Mr. Spencer seconded the resolution.

The Chairman briefly acknowledged the vote. He added that it was one of the most agreeable features of their position that they were so rapidly paying off this unpleasant debenture debt; and he hoped that, before many years were over, it would be entirely wiped out. The previous day their shares stood at 9$\frac{5}{16}$, which was the highest price that had been paid for them for many years past. He concluded by moving a vote of thanks to the officials and staff of the Company at home and abroad.

Mr. R. H. Jones seconded the motion, which was heartily agreed to.

The Secretary responded; and the proceedings then terminated.

**The Proposed Municipalization of the Chichester Water-Works.**—Mr. J. Mansergh, M.Inst.C.E., who has been engaged in investigating the undertaking of the Chichester Water Company, in view of the proposal to municipalize it, has made his report to the Town Council. He has found all the works and mains in first-class condition—the existing machinery being quite adequate to pump the water required to earn the present revenue; but he considers it desirable, on grounds of convenience and economy of working, to put in a larger and more modern pumping-engine, as the Company have for some time been contemplating doing. The mains he has examined are as good as new. On the question of finance, he puts down the profit balance of the undertaking at £2000 a year; and he considers this a well-secured income. Upon £50,000, the cost of purchasing the works, £2000 a year would be practically 4 per cent., and the price only 25 years' purchase of the income. If he were valuing the property for the purpose of arbitration, he would, he says, certainly not put it as worth less than 30 years' purchase, or £60,000.

## MATLOCK BATH GAS-WORKS ARBITRATION.

### Matlock Bath—Tuesday, Nov. 17.

(*Before Sir* William Coddington, *Arbitrator.*)

It may be remembered that some time ago the Matlock Bath Urban District Council approached the Matlock Bath Gas Company with the view of acquiring their undertaking, for which they offered £13,000, *plus* liabilities. The Company considered the offer inadequate, and demanded £26,000 for their works and plant. Thereupon the Council applied to Parliament for compulsory powers of purchase; and these they obtained by the Bill passed last session, which provided for the sale of the undertaking upon terms to be settled either by agreement or by arbitration under the Arbitration Act, 1889. The parties being unable to agree as to terms, arbitration was decided upon; and the Chairman of the Parliamentary Committee who had before them the Council's Bill—Sir William Coddington, M.P. for Blackburn—consented to conduct the proceedings. These were opened at the Bath Hotel, Matlock Bath, last Tuesday.

Mr. Lewis Coward and Mr. Hextall appeared for the Company; while Mr. Balfour Browne, Q.C., and Mr. Ram represented the District Council.

Mr. Coward, in opening the case for the Company, said it was formed in 1853 with a capital of £2000. The first annual profits were spent in developing and improving the works. In 1892, the Company were registered under the Joint-Stock Companies' Acts. In 1895, there was a thorough re-organization of the works; and it was found that their value far exceeded the amount of the capital, which was then £4500. The capital was therefore increased to the sum of £10,000, and £2000 debentures. When the re-organization had taken place, it was thought desirable for the Company to obtain statutory powers and in 1895 they applied for a Provisional Order. The Urban District Council thereupon gave an intimation that they intended to purchase the undertaking. Lieut.-Col. Addison, on March 17 of this year, held an inquiry at Matlock in regard to the Company's application. A great body of evidence was given on their behalf; but the Council did not call any evidence—deeming it necessary to keep their views secret. The Inspector made his report; and this was binding upon him (Mr. Coward). It was discussed in the Committee of the House of Commons, on the Council's Bill, whose inquiry concluded on April 21. The Bill was opposed by the Gas Company. The Council offered the Company the sum of £13,000, *plus* liabilities; but it was declined. The Committee thought the offer made was far from adequate; but no other was made during the proceedings in the two Houses. He might remark that the Arbitrator was well acquainted with the origin of the present investigation, from the important part he took in the inquiry in the House of Commons. With a view to shorten the case, accountants on both sides had been busily engaged. On behalf of the Council, Messrs. Alfred Lass, Wood, and Co., of London, had gone into the accounts of the Company, with the result that on Oct. 14 of the present year, the following revenue returns were made for the last three years: For the year ending Dec. 31, 1893, £680 10s. 7d.; 1894, £1005 2s. 3d.; and 1895, £801 17s. 3d. These figures, which produced an average of £829 a year, he was glad to say, had been agreed to by the accountants representing both parties. They showed a large return, and profits in proportion to the capital. The works were modern, and were in capital order. No material extension would be necessary for many years; and it was to be expected that the same rate of profit would be maintained. The business had advanced rapidly; and in three years it had increased by 135 per cent. At the same time, the price of gas was reduced from 4s. 9d. to 4s. 4d. per 1000 cubic feet. The producing power of the works was no less than 150,000 cubic feet per day. The Company had maintained their dividends for many years past. They had had no complaints as to the quantity or quality of the supply or as to the price; and he ventured to think that none would be made that day. The question was how many years' purchase was to be awarded. A great deal was said in the House of Commons Committee as to statutory and non-statutory companies, which represented a difference of four or five years' purchase. He did not deny there was a difference; but it was not a serious one. This was a non-statutory Company; but with such a record as they had, they should have very substantial protection. It was said that competition would be found in electricity; but he believed both electric light undertakings and gas companies would work together. Practically it came to this: That there was not much difference between statutory and non-statutory companies. The value of the property must be established by the worth of it to the owner. It was to be judged what the Urban District Council would receive from taking over the concern; and the present proceedings must be considered in reference to what the Company would lose. It had been decided to purchase the Company's property; and he (Mr. Coward) would ask for 10 per cent. for compulsory sale. The shareholders had to find, for any money they might receive, an investment which would compensate them for the loss of their property. They had surplus works, which would increase the profits in a few years. The total sum of £26,000 was asked for by the Company.

Mr. *H. E. Jones*, M.Inst.C.E., the General Manager of the Commercial Gas Company, examined by Mr. Hextall, said he had made an inspection of the Company's works and plant. Looking at the works as a commercial speculation, they were very good; and the capital spent upon them was very low. If no change took place in their ownership, the Company would, in four or five years, probably save about £350 per annum. As to the position of the works, the site was an excellent one; and he did not think it would be easy to beat it. Looking at the works as they now stood, he had no reason to suggest that removal of them would be necessary. They were well situated in regard to the conveyance of coal and other material, and the suitability of levels; and the buildings were very substantial. There was plenty of room for storage. Taking everything into consideration, no

material expenditure would be required upon the works for some time to come.

By the ARBITRATOR: The storage of gas, coals, &c., were trifles to the Company; the producing power would be an important matter. From a shareholder's point of view, there was nothing whatever to militate against the same success as now attending the future operations of the Company.

Examination continued: Shares in the undertaking were very much in request. Considering the total profits realized, he believed that a fair price was 26⅔ years' purchase. Then he would add to this 10 per cent. for compulsory sale. He took into account the increased consumption of gas. There had been exceptionally good times. A gross total of £27,269 was a fair valuation of the works and plant.

Mr. BALFOUR BROWNE (in cross-examination): I take it that we have to arrive at a fair valuation of the undertaking, and to fix a fair indemnity for the revenue?

*Witness:* Yes.

Then if you found that the revenue was £1000 one year and £500 the next, you ought not to take £1000 as the basis?—Of course not.

You say that, with the surplus works, the consumption of gas has increased by 38 per cent.?—Well, that was so in the past.

I must call your attention to the very important fact that there has been a diminution in the consumption of gas. Was the increase caused by Arkwright's Mills and the public lamps?—That may be so.

While other consumers caused a diminution in the consumption of gas?—I cannot say.

Was there any probability of a lighting extension?—There was a tendency to have more lights as the gas was very cheap.

You have said the works are in a good condition?—There were small matters that needed repairing. I have seen better retort-houses, and smarter roofs.

What is the percentage of gas unaccounted for?—In 1893 it was 9·03 per cent.; and in 1895, it was 16·35 per cent.

How do you account for that?—Well it was through the extensive length of mains.

In further cross-examination the following figures were brought out: From 1884 to 1889 inclusive, no record was kept of the gas made. The gas consumed in 1884 was 5,428,300 cubic feet; in 1885, 6,503,700 cubic feet; in 1886, 8,243,300 cubic feet; in 1887, 8,622,350 cubic feet; in 1888, 9,152,950 cubic feet; in 1889, 9,537,400 cubic feet; in 1890, 10,768,734 cubic feet; in 1891, 10,847,050 cubic feet; in 1892, 12,713,916 cubic feet; in 1893, 13,185,330 cubic feet; in 1894, 15,234,120 cubic feet; and in 1895, 15,330,640 cubic feet. The gas made in 1890 was 11,890,200 cubic feet; in 1891, 12,991,600 cubic feet; in 1892, 14,078,300 cubic feet; in 1893, 15,483,000 cubic feet; in 1894, 17,670,000 cubic feet; and in 1895, 18,709,000 cubic feet. Last year's figures worked out: Matlock Bath district, 12,793,840 cubic feet; Matlock district, 848,200 cubic feet; and Cromford district, 1,688,600 cubic feet—making the total consumption 15,330,640 cubic feet. The number of consumers in 1884 was 327; in 1894, 382; and last year, 393.

Mr. BALFOUR BROWNE: Do you think the carbonizing wages would be greater in large or small works?

*Witness:* They would be high in large works.

The ARBITRATOR: Do not the smaller works do less work per hour?

*Witness:* I do not think so.

Have you, in making your estimate of the valuation of these works, taken into account the various prices of coal?—No more than to ascertain what was the expense of bringing the coal to the works. The railway charges do not exceed 2s. per ton; and the carting only costs 10d. No matter how you move the material from the railway trucks into the yard, there will be some cost incurred in handling it.

My question was not in reference to the cost of carrying the coal here, but more especially whether you think the price will fall or rise from its present figure, looking to the future?—Well, my conviction is that, unless there is something revolutionary in trade, we are not likely to have very much higher prices.

In re-examination by Mr. COWARD, witness said that in future there was likely to be a good demand for gas-stoves. The usual price paid per 1000 cubic feet for repairs of plant, &c., was about 5d.

By the ARBITRATOR: He would value higher a gas company where they had a large number of consumers than one which was mainly supported by one or two big factories, because all the former would not change their minds at once. He thought 26⅔ years' purchase was an adequate valuation.

Mr. *Thomas Newbigging*, M.Inst.C.E., said that his experience in gas matters extended over forty years. He was well acquainted with Matlock Bath and district. The Gas Company were assisted by him in their application for a Provisional Order. Prior to going to Parliament, in March of this year, he assessed the structural value of the plant at £11,750. The site was freehold. The works were considerably extended in 1894 and 1895; but the Company had not had time to reap the advantages of their outlay. He had inspected the works, which were in good order. The site was capable of admitting further machinery and buildings, so as to allow of a largely increased production. There were 25 retorts; and several of them were fired on the regenerative system. They produced 160,000 cubic feet of gas per day; and they were capable of producing 93 per cent. beyond their present maximum make. In 1895, they made 18,709,000 cubic feet of gas, of which 15,330,000 cubic feet were consumed. There was a large telescopic gasholder, which could be extended. The distributing plant consisted of 10,000 yards of mains, exclusive of service-pipes. There were 370 meters, and about 25 cooking-stoves let out on hire. The works were under good management. The only unfavourable feature was that the leakage was rather high. The unaccounted-for gas in 1893 was 9 per cent.; in 1894, 12¼ per cent.; and in 1895, 16½ per cent. In a district like Matlock, they could never expect the leakage to be low, as the levels were very uneven. There were long lengths of mains where there was no consumption. He thought that 16 per cent. leakage was rather high, and that it would be reduced in the future. The average price of gas was about 2s. 11d. per 1000 cubic feet, which was most reasonable. He found that it was the lowest price in Derbyshire, with the exceptions of Derby, Buxton, and Ilkeston. The augmentation in the consumption of gas during the eleven years from 1884 to 1895 was 182 per cent. The average was 42 per cent. for five years. There was great scope in the Matlock Bath district for an increased consumption of gas for cooking purposes. Hitherto the Company had not pushed this business. The site of the works was an excellent one; and this certainly enhanced the value of the property. The works were a valuable investment for the shareholders. Ordinary gas stock could be made to yield from 3½ to 4 per cent. in a substantial concern. He thought 26⅔ years' purchase was reasonable. His figures for the surplus works were £2054, which made his total valuation £25,579.

Cross-examined by Mr. BALFOUR BROWNE, witness said that things could be done cheaper on a large scale than on a small one. He thought that 10 per cent. on the purchase was very fair, to help the shareholders to invest their money in another concern. The consumption of gas was not likely to decrease at Matlock. In his opinion 5½d. per 1000 cubic feet of gas was necessary to keep the works, plant, &c. in repair.

After some further questions, the inquiry was adjourned.

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**Wednesday, Nov. 18.**

On the proceedings being resumed this morning, it was announced that it had been agreed between the parties that Messrs. Arkwright's consumption was 41·69 per cent. of the quantity of gas made—other consumers being 58·31 per cent.; and the difference in the charge to Arkwright's and other consumers was 6·95d. per 1000 cubic feet.

Mr. *Corbet Woodall*, M.Inst.C.E., was then called. He said that the works were in good condition, and capably managed. He had examined the pipes in the district, and found them in fairly good state. The works were very favourably situated, because they were separated from the town by the river and the railway; and they were ample for present needs. The growth of the works was exceptional—having doubled in value during the last ten years. The price of gas in comparison with the capital engaged was very reasonable. The Company were so situated that they would be able to increase materially their business. The price of gas, compared with other similar places, was very low. A reduction in the price would not account for the falling off in the consumption; it would rather stimulate consumers to purchase gas. He believed that the consumption would be increased. A dividend of 3 per cent. on present capital and 4 per cent. on debentures would necessitate a charge of 13·7d. per 1000 feet. The shares in the Company would realize about 3½ to 4 per cent. He based his valuation of the property on the years 1894 and 1895. In 1893, the profits were low, because the price of coal was high. He would give 26⅔ years' purchase of the profit, and 10 per cent. for compulsory sale. On this basis, he assessed the value at £25,579. He considered the 10 per cent. for compulsory sale was eminently reasonable, as the shareholders did not desire to dispose of their works. They did not want to go to the London Stock Exchange, and invest money in a concern that they knew little about. The Company had one large consumer, which was more profitable than a number of small ones.

The ARBITRATOR: Do you state that it is a greater advantage to have a large consumer than to have a number of small consumers?

*Witness:* Yes, I should say so. Speaking generally, there was an element of safety about having a large consumer.

Mr. BALFOUR BROWNE: Do you know that the gas supplied to Masson Mills is utilized for cooking purposes?

*Witness:* I suppose so. The mill itself is lighted by electricity.

By Mr. BALFOUR BROWNE: The "gassing" in Arkwright's Mills was included in the manufacture. He did not suggest that the 40 per cent. decrease in the supply would be followed by a corresponding loss to the Company of 40 per cent., because the price of gas was now lower. The manner in which the mains were laid accounted largely for the waste of gas.

By the ARBITRATOR: He had seen pipes taken out of the ground 30 or 40 years old. It was not a very easy question to say what was the life of a gas-pipe. He had seen pipes in a pretty good condition when they had been taken out of the ground after 50 or 60 years. Sometimes in the case of wrought-iron service-pipes they oxidized quickly.

Mr. *Thomas Brown*, the Manager of the Matlock Bridge Gas Company, was then called, and said that he had occupied his present position since 1891. He was well acquainted with the situation of the Matlock Bath Gas-Works, which was a convenient one. Since 1891, a lot of new plant had been put down, and improvements had been decidedly advantageously carried out. The works were quite adequate for present needs. The manufacturing capacity was about double to what they now supplied. The purifying apparatus was very good, and equal to any works of the same size. He had not gone over all the meters to examine them. There were 403 consumers, 97 of whom had their own meters. The rest belonged to the Company. Out of the 306, he inspected 279. There were 212 dry meters—206 being in tin cases, and 6 in cast-iron cases. There were 67 wet meters. Since 1890, they had put in 141 new meters. The Company keep the meters in good repair; the makers guaranteeing them for five years. The oldest meter was put in in 1868. The average age of all the meters was 8·6 years. The average life of a dry meter was about 20 years; while a wet meter would last about 30 years. He had seen several lengths of the mains; and they were in very good condition—in fact, as good as new. In 1893, he replaced about 1000 yards with new pipes—3 and 4 inch instead of 2-inch. They were in good condition. The soil in the part where the pipes were laid was practically the same as in the Bath district. He had re-laid the pipes again. The limestone was a great preserver to the pipes, as there was scarcely any corrosion.

Mr. BALFOUR BROWNE: Are you supplying gas at 2s. 6d. per 1000 cubic feet to one large consumer?

*Witness:* Yes; that is so.

I suppose if any consumer would take the same quantity of gas, he would have it at the same price?—I cannot say that. It would have to be considered. Our ordinary price of gas for lighting purposes is 3s. 6d.; and for cooking and heating, 3s.

The ARBITRATOR: How is it that you let that consumer have gas at a less rate?

*Witness:* Because he has a gas-engine.

Is that the only gas-engine in the district?—With the exception of one we use ourselves.

Mr. *A. W. Elton*, late Manager of the Matlock Bath Gas Company, and now Manager at Littlehampton, said that he was connected with the Matlock Bath works for a little over three years. At present the works were in a good condition. The mains were also in a satisfactory state. While he was Manager, he increased the storage capacity and laid new mains in the Cromford district; and, in fact, the works were remodelled, and improvements added. The cost of production per ton of coal compared very favourably with that of other companies. The gas was very good in quality, because they used good coal. The storage capacity of the works was ample for some time to come, unless the consumption was largely increased; and then the holder could be telescoped. The latest improvements in gas manufacture had been adopted. The levels in the Bath district were disadvantageous for gas supply. There was a difference of 300 feet between the highest and lowest points of the district. If Arkwright's Mills required more gas, they would have to increase the pressure, which would raise the percentage of leakage.

The ARBITRATOR: Do you say that the large increase of leakage in 1895 was in consequence of the reconstruction of the works, and the effect of other improvements, after which they would go back to your normal waste?

*Witness:* That is so. The leakage was not in any way in the distributing plant.

Should you have noticed it before 1895, if it was so?—Yes, certainly.

Further examined: They did not keep any account of gas used at the works. When there was a large make, they used a lot of gas. The prepayment-system and the adoption of cooking-stoves could be pushed more vigorously in future. At Littlehampton, in about ten months they had supplied 150 prepayment meters. There were 58 shareholders in the Company; 29 living within three miles of the works. Very few lived outside Derbyshire. They were connected with the district. The £5 shares were worth about £11 10s., as compared with similar companies.

Mr. BALFOUR BROWNE: What experience have you had in valuing shares?

*Witness:* I do not say that I have valued them. I say I have seen them sold.

Mr. *Robert Hall*, Secretary of the Matlock Bridge Gas Company, was then called, and said that at the Bridge they had about 170 meters, while at the Bath they had 70; and at the former place they were on the increase. The consumption at the Bridge was 27 million cubic feet, as against 15 million cubic feet at the Bath. In the Bridge district, they had 160 prepayment meters in use—an increase of about 30 during last year. The gas-stoves and the prepayment system could be further extended in the district. He had been dealing in shares for some time; and there had been a continual demand for shares in the Company. There had been no material signs of a decrease in the value of the shares since it was known the Council desired to purchase the works about two years ago. Such an investment would be a permanent one; and a careful investor would desire to put his money into such a concern. The £5 shares were worth about £10. The Bath shares obtained a better price than the Bridge shares. Investors, especially careful ones, did not like the Stock Exchange quoted shares. They preferred local companies.

By Mr. BALFOUR BROWNE: The Bridge Company supplied about 9000 people with gas. In the Bridge alone about 1300 were supplied, while the Bath supplied 400. He would mainly rely upon the working class for the extension of the prepayment system. They had one large consumer, who required about 3 or 4 million feet of gas; and the Midland Railway needed about 4½ millions. He knew about the Chesterfield arbitration case, where the shares were being sold for £16; but the Arbitrator only awarded £12. Speaking of the value of the shares, he said in January they brought nearly £10 each. He was aware that the statement that the £5 shares had received a 10 per cent. dividend, was incorrect. New shares had been supplied to the original shareholders, and nothing had been paid upon them prior to the selling of the shares.

The cross-examination of the witness concluded the case for the Company.

Mr. BALFOUR BROWNE, in opening the case for the Urban District Council, said he would refer the Arbitrator first of all to the year 1892, when negotiations were originally entered upon. Then the Company said they were not unwilling to listen to the proposal; but at the time the Council were not in a position to purchase. In 1895, they put themselves into the needful position, and gave notice of a purchase Bill. The proceedings, as they all knew, were prolonged, at considerable expense; and in the end they left it to the Committee to say what was the value of the works. If they had closed and accepted the offer of the Council, the huge expense of meeting in arbitration would not have been incurred at all. The matter was fought for seven days in the House of Commons, and for three days in the House of Lords; and all the money had been unnecessarily thrown away. Now they came to the question as to what should be paid for the works. The other side had said that the profit of £802 was maintainable; but that certainly was not the case. First of all, they must see whether the Company's income was going up or down. Why should they have gone back such a long way to get the averages? Mr. Woodall had gone back ten years, and had made 183 per cent. But if they took the averages in that way, they must take them like that all round. If so, what was the effect on the private consumers? There was a diminution, and not an increase in consumption; for he found that Arkwrights in five years decreased 1 per cent. It was urged that this was the turning point—that there was no chance of an increase here. He agreed that a good business had been done in cooking-stoves; but the question of having stoves had gone like wildfire, and there was now a probability of a standstill in that matter. There was, in fact, no future for the Company at all. The place was small—containing only about 2000 inhabitants. In summer the population reached about 20,000, as the result of tourists or pleasure seekers. The summer visitors, however, did not add to the consumption of gas. The total profits of the Company in 1895 were £801, which was the demand they made on account of the whole business. First, for repairs and renewals they had expended only 3·52d. per 1000 cubic feet; and this should be 6d., or £143 in all added. Secondly, wages for carbonizing should be put at least to 3d., or £36 more than was reckoned. In respect of the amount received from residuals, this should be reduced by 5d.—equal to £31. The total of these three items was £211, leaving a balance of over £590. There were two further deductions to be made on account of the improved burners at Masson Mills, which would save 20 per cent. of the gas now used there. Any way, the profit due to supplying 1,015,000 cubic feet of gas there was not maintainable. This profit was equal to £25. Again, in order to ensure the sale of the gas now supplied, the excessive price must be reduced 4d. per 1000 feet, entailing less revenue by £67. The total for these items deducted from the £590 left a balance of £496, which was maintainable profit, and the amount upon which they had to calculate the value of the works. They found that in the year 1895, 3·52d. per 1000 feet of gas sold kept the works in repair; but nothing less than 6d. would do so at the present time. They could not maintain their income without this outlay. The Masson Mills had complaints against the Company. They had been offered gas at a cheaper rate; and it was natural that they should desire it. In conclusion, he said some difference must be made between a statutory and a non-statutory company. If they reduced the 26¾ years to 18 years, which was fair, and multiplied £496 17s. 7d. by it, it would bring out a total of £8943 16s. 6d. They claimed 10 per cent. for compulsory sale; but he thought the present valuation was adequate. The Company said at one time they were not unwilling to sell; and he hoped this view would meet with the approbation of the Arbitrator.

Mr. *Alfred Lass* was then called, and verified his version of the Company's accounts.

In answer to Mr. COWARD, witness said he should not be surprised to find the cost of carbonizing was as low as 2¼d. per 1000 feet of gas made at Matlock Bridge. He would have been sorry to allocate the Manager's salary in any other way than he had done.

Mr. COWARD: Supposing half Mr. Elton's time was occupied in repairs and renewals, should not £50 be charged to that?

*Witness:* I have never heard of such a proposition.

I do not understand you to suggest for one moment that the figure you give (£802) is not maintainable profit?—I do not suggest it.

You do not suggest any figures as to what is maintainable profit?—No.

Are you here to suggest that £802 is not maintainable profit?—By the knowledge I have gained here, it is not maintainable.

Then, what is?—I cannot say.

You can give me a figure?—I have not in the whole course of my experience given any evidence as to maintainable profit, and I never intend to do so. I leave that to engineers after I have got out the figures.

Mr. COWARD: But you have.

Mr. BALFOUR BROWNE: That was only because you pressed for it.

By Mr. COWARD: Taking the ordinary consumers by themselves, there was a decrease of 1·89 per cent. in the gas supplied. Taking large consumers by themselves, there was a decrease of 0·89 per cent. per annum compound. Public lamps have increased 4·37 per cent.; and Arkwright's Mills have increased 11·36 per cent. Coming to the total, there was an increase of 5·43 per cent. Putting in the stoves, and leaving out Masson Mills, there was an increase in the consumption for the five years of 2·11 per cent. per annum. The ordinary consumers, the public lamps, and the stoves taken altogether represented 58·41 per cent. of the gas sold; and the quantity sold to Arkwright's Mills was 41·59 per cent.

By the ARBITRATOR: The difference between his figures and the Company's was simply a matter of re-allocation.

### Saturday, Nov. 21.

On the resumption of the proceedings to-day, further evidence was given; among the witnesses called on behalf of the Council being Mr. E. H. Stevenson, M.Inst.C.E., and Mr. W. R. Chester, M.Inst.C.E. The former put the value of the Company's profits, at 18 years' purchase, at £8943; and the latter, at £9000. Mr. Balfour Browne briefly addressed the Arbitrator; and Mr. Coward replied at some length. The inquiry then closed; Sir W. Coddington stating that he would take a few days to consider his decision. A report of this portion of the proceedings will appear next week.

## THE LIGHTING OF THE KILKENNY DISTRICT ASYLUM.

A short time ago, the Board of Control of the Kilkenny District Asylum had under consideration the question of the lighting of the institution, which is done by gas obtained from the Kilkenny Gas-Works, of which Mr. George Anderson is lessee. The Board complained that the lighting was "bad and insufficient;" and they requested Mr. J. R. Wigham, of Dublin, to investigate the matter. He accordingly visited the building; and, after an inspection, he came to the conclusion that the Board's complaint was justified. He then proceeded to the gas-works; and, though he found them adequate for the supply of the asylum, there were two points which he thought needed improvement. In the first place, the supply-main was not large enough; secondly, the quality of the gas was not up to the standard. He was informed that, under his contract, the lessee was bound to supply 12-candle gas; and, as far as he could observe (there being no photometer), the gas did not come up to this quality. He learned that it was made from Pelaw coal, which, with careful carbonization, would yield about 12-candle gas without any admixture of cannel or richer coal. He found the gas contained sufficient carbonic acid to lower its illuminating power; and, moreover, there was in operation "a system of pumping air into the gas," which also tended to reduce its light-giving quality, and consequently its value to the purchaser. Figures had been supplied to Mr. Wigham, by an official connected with the asylum, in regard to the cost of fitting up gas-making apparatus at the building; and he found them correct, and expressed the opinion that the institution could be supplied much better and cheaper from such plant than by gas obtained from Kilkenny. Furthermore, the coal employed would produce gas of at least 18-candle power, and, its supply being under the control of the officers of the asylum, it might be relied upon

to be absolutely free from impurity, and to be sent out at any desired pressure. The erection of works in proximity to the building would necessitate only a small outlay for a supply-main; and the spare heat from the retorts could be utilized for warming the institution by steam, as well as for cooking purposes. Summed up, Mr. Wigham's answers to the questions submitted to him were as follows: The Kilkenny Gas-Works are adequate for the supply of the asylum; but this supply cannot be secured without a new 4-inch main, the cost of which would be £297. Even if such a main were laid, the quality of the gas, if manufactured as at present, would be unsatisfactory; and, if it were improved, there would never be the same security that good gas would be uniformly and continuously supplied as there would if the manufacture were under the control of the officers of the asylum, inasmuch as the Gas Company were not under statutory obligations to send out gas of any defined quality. Mr. Anderson had written to the Board to the effect that he would enlarge the main, provided his tender (£350) for certain interior gas-fittings were accepted. Mr. Wigham's opinion was that the work could be done for considerably less than this. The foregoing conclusions were embodied in a report which came before the Board of Governors on the 21st ult.; and, in view of the importance of the question, it was decided to consider it at a special meeting on the following Thursday. This was accordingly done; and on that occasion a reply was read from Mr. Anderson. He pointed out that he had sanctioned Mr. Wigham's inspection of the gas-works in order that he might report as to their fitness; but that this gentleman had not only occupied the bulk of his report in advising the creation of separate gas-works for the supply of the asylum, for which, as he (Mr. Anderson) understood, an estimate had been submitted by Mr. Wigham's firm, but had used language so condemnatory of him as a gas maker and of the Pelaw Colliery Company as coal suppliers, that "he might hear from them later on." Dealing categorically with Mr. Wigham's conclusions, Mr. Anderson admitted that the gas supply at the asylum was insufficient; but he denied that it was bad. As to the inadequacy of the main, he undertook, in his tender for the fittings, to deal with this; and he made the terms of payment such as would leave £100 in the hands of the Governors till he satisfied them. He denied there was no photometer at the works, one having been in use for years, though possibly not of the form with which Mr. Wigham was familiar. As to the quality of the gas, Mr. Anderson said he used the best coal he could get at Newcastle—Pelaw being one of those commanding the highest price. He did not think the worst coal shipped at Newcastle would produce less than 12-candle gas; while the best (the kind he used) yielded 15-candle, and, with some coal he procured from Liverpool to carbonize with it, considerably better gas than that. He admitted that the coal proposed to be used at the asylum would produce 18-candle gas; but he pointed out that the cannel-fields were nearly exhausted, and that oil was being used as an enricher—requiring the erection of different apparatus. As to the pumping of air into the gas, Mr. Anderson explained that this was not for the purpose of adulteration, as might be inferred from Mr. Wigham's report, but to assist the purification of the crude gas—the air being absorbed in the purifying material. With regard to the presence of a slight quantity of carbonic acid in the gas, Mr. Anderson thought this statement about as true as that in regard to the gas-producing quality of Pelaw coal. His Manager denied the accuracy of Mr. Wigham's test. Reverting to the question of the main, he said it was his intention to enlarge it as might be found necessary to give an abundant supply of gas, which was to his interest. He concluded by advising the Governors to continue taking their gas from the Company, and not to incur the expense or responsibility of having private gas-works. He pointed out that, if they accepted his tender, this would be their entire outlay; and the work would be proceeded with at once. The reading of Mr. Anderson's reply was followed by a long conversation on the subject of it; an opinion being expressed that, as he had undertaken to lay a new main and supply gas sufficient in quantity and quality, he ought to be dealt with. A question arose as to how Mr. Wigham came to be employed by the Board of Control. The six names submitted to the Board for their selection were read; but Mr. Wigham's was not among them. This was thought to be rather strange. In the course of the proceedings, it transpired that a gentleman in the district would be in a position, in about six months, to supply the electric light to any place in Kilkenny; and eventually it was decided to appoint a Committee to confer on the matter with the gentleman referred to.

## THE TRURO GAS-WORKS IN DANGER.

The truth of the aphorism as to important events resulting from comparatively trifling causes was exemplified in Truro on Monday evening last week, when the stock in a large timber yard was very seriously damaged, and the adjacent gas-works were placed in jeopardy, owing, according to the report in a local paper, to the simple fact that some children happened to select a few matches for their playthings, and to choose a stable for their playground. About five o'clock on the evening in question, the children in the course of their play managed to kindle a tiny flame, which set fire to the straw, and soon became a blaze; and this developed into a conflagration such as the city has not witnessed for many years. The stable, which belonged to the Truro Gas Company, was situated immediately opposite the works, and close to the timber yard, of Messrs. Harvey and Co., Limited. As soon as the fire was discovered, the brigade were summoned; but before they could get to work one of the timber sheds, containing a stock of pitch pine battens, was in flames. With all possible speed, attachments were made to the Water Company's hydrants; and a manual engine was called into requisition. This was placed in the Gas Company's yard, where fortunately there was a well which furnished a very bountiful supply of water. Within a short time, eight powerful streams of water were brought to play upon the flames; the object of the firemen being to prevent them extending to the gas-works and to a large building in which timber of a very inflammable and valuable kind was stored. At a quarter to eight, assistance was rendered by the fire brigade from Redruth, whose steam-engine did good service in quelling the flames. Nine streams of water were now in use; and happily the combined efforts of the brigades were at length successful in placing the gas-works out of danger. Operations were then directed to extinguishing the burning pile of timber; but it was not until Tuesday morning that this was accomplished. The quantity spoilt is estimated as being worth about £2500; but it is covered by insurance. The damage done to the Gas Company's property is only slight; and they are also insured. The Manager (Mr. S. J. Ingram) and his staff rendered valuable assistance; while his colleague at the Water Company (Mr. W. J. Lean) gave ample proof, by the abundant supply of water he kept up, that in their water-works the citizens have an invaluable boon. It is estimated that about 1000 tons of water were drawn from the reservoir; and yet on Tuesday morning, by continuous pumping, it was almost as full as usual.

## ELECTRIC LIGHTING NOTES.

Before commencing the erection of their electric light station, the Town Councillors of Kingston-on-Thames, like wise men, sat down and counted the cost; and in this task they were aided by the great experience of Mr. Preece. But some of them, it appears, did not carry their calculations far enough; for now there are murmurings as to the continually increasing expenditure of capital. This has somewhat upset the Chairman of the Electric Lighting Committee (Mr. Collinge); and he has threatened to withdraw from that position, if the Committee are to have their hands tied in their efforts to develop the business, and make the concern a paying one. At the annual meeting of the Council on the 9th inst., Mr. Collinge stated that the Electrical Engineer had asked him to give permission for the ordering of some cable he required, at a cost of between £50 and £60; but "in the present temper of the Council," he (Mr. Collinge) did not feel disposed to take upon himself the responsibility of the outlay. He proceeded to state that the number of lamps fixed and applied for was 6740. Mr. Preece told them long ago that the installation in its present condition was only adapted for 7000 lamps; so that they were already within 260 of that number. Mr. Preece, in giving his estimate, calculated that the average number of lamps in use at one time would be only one-half of those fixed. A large proportion of the lamps connected, however, were for shop illumination; and therefore considerably more than half were running at the same time. This being so, the machinery they had was barely adequate to the demand; and before they could take on new customers, they must face the provision of a new engine and boiler, and other additions. The financial position of the Committee was next explained by Mr. Collinge; and certainly the statement cannot be regarded as an encouraging one for the doubting councillors. The Corporation were, he stated, indebted to Messrs. Siemens to the extent of £3770, in addition to which the capital account had been overdrawn to the amount of about £1000. Therefore they were face to face with a deficit of between £4000 and £5000; and a further expenditure must be undertaken before next year approximating to £6000. That they must pay Messrs. Siemens was perfectly clear. The money had been largely spent in connections for houses, extensions of cables, transformers and meters, and in the labour necessary for laying new arc light cables. They could not connect another customer without spending more money; and in doing this, they would be piling up the debt. Then if Mr. Preece was to continue his work as Consulting Engineer, they would have to pay him 3 per cent. on the outlay of £6000. It was now proposed that the work should be performed by their Electrical Engineer (Mr. Edgcombe); and yet some of the members had the meanness to propose to reward him by giving him this extra work without any increase of salary! Was that generous or just? There were two courses open to the Corporation. One was, having put their hands to the plough, not to turn back, but to go on until the undertaking was in a similar position to those at Brighton and Bradford—a paying concern. This was the proper and legitimate course. But there was an alternative; and, if they were afraid and timid, and would rather stop where they were, they could sell the undertaking. Better sell it than starve it, he exclaimed. At the present time, they were only paying £100 towards the interest of the money they had expended; and they would never reach the point of being able to repay capital as well as interest, if they stopped where they were. He moved the approval of the minutes, and hoped this would carry with it sooner or later that which he thought was its only logical outcome—an increased salary to the Electrical Engineer, and a further expenditure of capital necessary for the extension of the works, in order to meet the demands for light. Mr. Salmon seconded the motion, and deprecated the idea of selling the undertaking to a private company. It might, he remarked, cost £50,000 or £60,000; but by that time, he had no doubt it would be a thoroughly paying concern. After a brief discussion, the motion was carried.

The following remarks which appeared in the annual mayoral statement give one the idea that the Halifax Corporation Electric Lighting Department is not progressing by leaps and bounds: "Under this head last year we had a loss of something like £1400. Of course, we anticipated this on account of the cost of the new works; but this year our loss has been reduced to £600—showing that the light is gradually gaining in favour. People sometimes think our rates are rather high; but they should not forget unforeseen expenditure." It was added that Halifax is much better lighted than it used to be; and that about £8200 a year is spent in lighting the streets.

The supply of electrical energy by the Huddersfield Corporation has during the past year increased more rapidly than at any time since the commencement of the undertaking. The number of consumers connected to the system in November, 1895, was 252, with lamps equivalent to 18,500 of 8-candle power; while now there are 356 consumers, with lamps equivalent to 27,000 of the power named. In the year the sale of current has risen from 216,341 to 285,566. The period allowed by the Local Government Board for repaying the loans borrowed for the purposes of the department has been extended to 25 years, which will decrease considerably the annual amount to be provided for sinking fund. It is expected that the working will show a small profit at the end of the year.

The Birmingham City Council were discussing on Tuesday last a

proposal to spend £10,143 10s. on an installation of the electric light, and the necessary buildings, for the new meat market and slaughterhouses. The Market and Fairs Committee, it appeared, had considered the question of having incandescent gas-lights; but the Gas Committee had advised them not to adopt the system for a variety of reasons. It was believed that incandescent electric lights were the best suited for the particular purpose of the market. However, gas is to take a fair part in the lighting; it having been decided to generate the electricity by gas-engines to be purchased of Messrs. Crossley Bros., Limited, who had guaranteed them to work properly for five years. The sum to be expended on the installation was considered by one member to be very exorbitant, as it amounted to 10 per cent. on the entire cost of the market. The proposal was adopted by 54 votes to 6.

The Electric Lighting Committee of the Hampstead Vestry reported last Thursday that they had "instructed the Vestry Clerk to resist the claim, amounting to £11 16s. 1d., made by Messrs. B. Dellagana and Co., Limited, for loss of time and delay of work by a failure of the supply of electric current to their branch at Gayton Road, which they alleged to have been caused by a breakdown on the Vestry's main." Should the case come into Court, the report thereof should prove interesting reading. The Vestry then agreed to lay a low-tension main for the supply of electric current to Christ Church, Hampstead Square, at an estimated cost of £52. A member, however, suggested that perhaps the income from this source would hardly repay the capital expenditure; whereupon the Chairman of the Vestry (Mr. H. Harben) made a remarkable statement: "If this happens to be a failure, you cannot help it; you are doing it for the good of the parish"—an easy-going way of explaining parochial expenditure that could hardly be more ingenuous.

The Cheltenham Town Council have sought the sanction of the Local Government Board to the borrowing of £2620 (in addition to the original loan of £23,000) for electric lighting extensions. In his evidence at the inquiry into the application, Alderman Norman stated that the output from the works now represented about £70 a week; and it was expected the undertaking would shortly make a profit.

Notwithstanding the recent very unmistakable expression of opinion on the electric light question by the ratepayers of Newmarket, the District Council, at their meeting on Monday last week, resolved to take the necessary steps to obtain a Provisional Order; and the usual notice has been given. The Council had before them a letter from the Chairman of the public meeting held on the 4th inst. (Mr. W. B. Sheppard), enclosing a copy of the resolution then passed, protesting against the proposal of the Council to produce and supply electricity in the borough. The Clerk was simply directed to acknowledge them.

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**Proposed Purchase of the Budleigh Salterton Gas-Works.**—Another local authority in Devon are taking steps with a view to the acquisition of gas-works. At a meeting of the Budleigh Salterton District Council on Tuesday last, Mr. Parsons proposed that the Gas Company should be asked to sell their works to the Council, and to name a price at which they would be disposed to sell; and that, in the event of a refusal to treat, the necessary steps be taken to oppose the Company's application to Parliament for incorporation and for power to supply the electric light. Apparently, as a matter of diplomacy, the second portion of the resolution was dropped; and the Council adopted the first part, inviting the Company to treat with a view to the sale of their works.

**The Cuckfield District Council and the Sussex Water-Works.**—The Local Government Board, as a result of an inquiry by one of their Inspectors, have informed the Cuckfield Rural District Council that they are disposed to comply with their application for consent to purchase the Mid-Sussex Water-Works; but they consider that the Council should enter into a provisional agreement with the Urban District Councils of Cuckfield and Hayward's Heath by which these bodies would purchase the works within their respective districts, or settle the terms upon which the Rural District Council would supply them with water. Mr. Mansergh or Mr. Strachan is to be engaged to report fully on the works, and to advise the Council as to the proposed purchase.

**Dowson Gas v. Ordinary Gas for Motive Power.**—At a meeting of the Trowbridge Sanitary Committee last Wednesday, a question as to what motive power should be employed at the pumping-station in connection with the sewage works was considered; the Engineers giving the preference to gas-engines, and pointing out that Dowson gas could be manufactured at 1s. per 1000 cubic feet, as compared with the price charged by the British Gaslight Company for their gas. The Committee recommended the employment of gas-engines with Dowson gas. On the report being subsequently made to the Town Council, Mr. G. Coleman asked that the question of using Dowson gas should be referred back. Mr. Stanley said he had written to the Gas Company, who now offered gas at 2s. 6d. per 1000 cubic feet; and he said he did not think the Council could expect to get gas at a cheaper rate than this. It was agreed to have gas-engines, but the question of what kind of gas should be employed in them was referred back.

**The Southampton Corporation and the South Hants Water-Works.**—The Southampton Corporation are proposing to extend their operations by acquiring the works of the South Hants Water Company. Having sent a communication to the Directors on the subject, these gentlemen, through their Secretary, replied that they were not willing to sell the whole or any part of the undertaking; but if an offer was made on behalf of the Corporation, they would give it their careful consideration. Upon the receipt of this letter, the Council discussed the matter in private, and resolved that the Company be informed that they were prepared to purchase the whole of the undertaking, or, if preferred by the Company, the part that was exclusively used for the supply of the borough, upon terms to be agreed upon, or, in default of agreement, to be settled by arbitration. It was also decided to make a formal offer to the Company. This movement is the outcome of the enlargement of the borough; the inhabitants of Freemantle, Shirley, and Fitzhugh, who are now ratepayers of Southampton, having to pay more for their water than the residents of the borough proper.

## THE LONDON COUNTY COUNCIL AND THE WATER QUESTION.

### The Projected Bills for the Acquisition of the Water Undertakings.

The London County Council issued last Friday the necessary notices of their intended application to Parliament next session for power to acquire the undertakings of the Metropolitan Water Companies, and to create and issue stock or annuities for the purpose. Eight separate notices have been given; but, as they are similar in terms, only one need be dealt with.

Taking the notice in regard to the Chelsea Company, it states that the Bill to be promoted is to enable the Company on the one hand and the Council on the other, to enter into and carry into effect any agreement for the sale and transfer to the Council of the undertaking of the Company, or any part thereof, for such consideration, and on such terms and conditions, as may be agreed. For the purposes of the Bill, the undertaking is to be defined as including the water-works and works connected therewith, and all property (real and personal), money, securities, and effects, and all rights, powers, authorities, and privileges of the Company, of whatever nature and description, or some part or parts thereof. Provision is to be made for the compulsory purchase and acquisition of the undertaking by the Council, and for the transfer of it to them, from such date, on such terms and conditions, and in such manner, as may be determined by an Arbitrator or Arbitrators to be appointed for the purpose, or be defined by the Bill. The Arbitrators are "to have regard to such contentions or evidence affecting the fair and reasonable value of the undertaking as they may think fit, in order to ascertain a fair and reasonable value to be placed on the undertaking, having regard to all the circumstances of the case;" and they are to have absolute and unfettered discretion. They are "not to be precluded by any legal objections from considering any matters or contentions alleged to affect the fair and reasonable value of the undertaking;" and provision is to be made that there shall be "no addition to the fair and reasonable value of the undertaking in respect of compulsory sale." The Council are to be authorized to provide for the re-investment of the purchase-money in Metropolitan Consolidated Stock, or otherwise, without cost to the proprietor of stock or shares, or to make some allowance in respect of the expense of re-investment. Power will be sought for the conversion, by agreement, of debentures, debenture stock, or shares or stock of the Company into Metropolitan Consolidated Stock, annuities, or other security. Authority will be asked for the inspection of the lands, works, and accounts of the Company by the Council, for the carrying on of the undertaking up to the date of its transfer, and for dealing with the officers and servants. The method of entering into possession before the consideration-money has been ascertained and the terms and conditions of possession have been specified, is to be defined. Power is to be conferred on the Council and other local authorities to enter into agreements with respect to the following matters: The sale or transfer to any other county or local authority of any other part of the undertaking, or of any other water-works, not required for the present or future supply of water to London, or of any joint right or interest in such part of the undertaking or water-works; the lease to any other county or local authority of any part of the undertaking, or any other water-works, or of any joint right or interest therein or in any part thereof, for such term and on such conditions as may be agreed; the supply of water in bulk to any other county or local authority for supply by them within all or any part of their district. It is proposed to authorize county councils and local authorities of districts outside the County of London, but within the area of supply of the Metropolitan Water Companies, to maintain water-works and supply water in their respective counties or districts, and to combine in any scheme for the administration of the water supply of their districts, upon terms to be agreed upon; and the Bill may provide for an apportionment of the undertaking, or any part thereof, on terms to be settled by arbitration on the basis of a fair and equitable apportionment of the undertaking and of its cost, having regard to the present and prospective requirements of the County of London and the districts of the other authorities. The Bill will confirm and give effect to any contract or agreement between the Council and any other county or local authority, or between the Council and the Corporation of the City of London, with respect to the foregoing matters. Provision will be made for the management and administration of the supply of water by a Committee, to consist of representatives nominated by the Council and the Corporation of the City of London, or otherwise, as may be defined in the Bill. The functions and powers of the Council and of the Committee respectively are to be defined; and the admission on the Committee of representatives of other councils or local authorities concerned, and the appointment of Sub-Committees, will be arranged for. The Bill will provide for the application, in the proposed purchase, of the sinking funds held by the Chamberlain of the City of London under various Water Companies' Acts. If the Council purchase the undertaking, they will proceed to acquire those of the other Metropolitan Water Companies by arbitration; and the latter are to be required to sell in the manner set forth in the Bill. Provision will be made for raising the necessary purchase-money by the creation and issue of stock or annuities (perpetual or terminable), and for the redemption of such stock and the repayment of loans and interest. All costs and incidental expenses are to be charged upon the county rates. Separate accounts are to be kept of the revenue and expenditure of the undertaking; and any deficiency in the former is likewise to be charged upon the county rate. The Bill will vary or extinguish any powers or privileges which may interfere with carrying its objects into effect; and it will amend or repeal, if necessary, any Act or Acts affecting the Company.

The term "Metropolitan Water Companies," in the notice summarized above, means, of course, the Chelsea, East London, Grand Junction, Kent, Lambeth, New River, Southwark and Vauxhall, and West Middlesex Water Companies. In the remaining seven notices, the clause in regard to the sale of any portion of the undertakings to other bodies is worded somewhat differently, and runs as follows: "To confer power on the Council on the one hand and on any other county councils and local authorities, or any of them, with such consents or limitations or exceptions (if any) as the Bill may define, on the other

hand, to enter into and carry into effect any agreement with respect to the following matters: The sale or transfer to any other county or local authority of so much of the mains, pipes, and works of distribution acquired by the Council from the Company and any other Metropolitan Water Company as is exclusively appropriated to the distribution and supply of water within the district of such other county or local authority, together with the rights and powers of supplying water therein, and of making charges in respect thereof, which will have been transferred to the Council from the Company or any of the other Metropolitan Water Companies; the sale or transfer to any other county or local authority of any other part of the undertaking or of any other water-works which is not required for the present or future supply of water to London, or of any joint right or interest in such part of the undertaking or water-works; the lease to any other county or local authority of any part of the undertaking or of any other water-works, or of any joint right or interest therein, or in any part thereof, for such term and on such conditions as may be agreed."

Notice has also been given for a Bill—the London Water-Works (Purchase) Bill—to enable the County Council to create and issue stock and annuities. It is specified that, in the event of the Council purchasing the undertakings of the Metropolitan Water Companies, or any of them, or any part thereof, power is to be given to them from time to time to raise money by the creation and issue of consolidated stock or annuities (perpetual or terminable), to such amount as may be necessary for the purposes of any such purchase, or to use for those purposes money standing to the credit of the Consolidated Loans Fund, and to define the period within which provision should be made for the redemption of such stock, and to make provisions as to the payment of interest or dividend thereon out of the above-named fund and the county rate; and to enable the Council to include in their estimates and precepts for the purpose of this rate such sums as may be requisite. The Bill may provide for the creation and issue of stock or annuities charged on the revenue derivable from any undertaking purchased, and collaterally on the county rate of the Administrative County of London, and may authorize the creation and issue of such stock either as part of, or in addition to, any existing Metropolitan Consolidated Stock or as a separate stock.

## WEST MIDDLESEX WATER-WORKS COMPANY.

The Half-Yearly General Meeting of this Company was held last Tuesday, at the Offices, Marylebone Road—Mr. E. Boulnois, M.P., in the chair.

The Chief Clerk and Secretary (Mr. F. H. Wybroo) read the notice convening the meeting, and also the report of the Auditors. It stated that the reserve fund remained the same as reported in the previous half year; and the capital was also the same—£1,538,098. The total outlay on works had been £1,540,201, including £38,385 expended in the six months ending at Michaelmas. The revenue for this period was £130,602; showing an increase of £3345 on that of the corresponding one of 1895. The water-rental was £110,671; and the balance carried to the credit of the dividend and interest account was £62,316.

The Chairman, in moving the adoption of the report and accounts, said that he was sure the proprietors would all agree with him in expressing deep regret at the retirement from the chair of Sir William Wyatt, the value of whose work for the Company it was impossible to exaggerate. As a Director and as Chairman, he had maintained at the highest point the prosperity of the undertaking. It would be a satisfaction to them to know that though, of his own choice, Sir William Wyatt had retired from the chair, in order to be relieved, to some extent, of the responsibilities and duties, which were somewhat arduous, attaching to the position, the Company would still have the benefit of his advice, as he would remain on the Board, they hoped for many years to come. He (the Chairman) felt he had a difficult task to follow in the footsteps of so able and energetic a predecessor. He appreciated to the fullest degree the confidence and the kindness of his colleagues in electing him as their Chairman; and it would be his earnest desire to act up to the former precepts and practices, and endeavour to maintain and promote the well-being of their valuable undertaking, which continued its course of prosperity. He did not think anyone would have reason to find fault with the state of things disclosed by the accounts. The works were maintained at the highest point of efficiency; and he thought he might say that all their engines were new—the old type having practically disappeared. It was stated in the report that two of the new storage reservoirs at Barnes had been completed; but the Directors had been informed that morning by the Engineer that a third had now been finished, and that water would be admitted into it. The proprietors would therefore feel that they were relieved to a very great extent of anxiety on that account. The progress made with the works at Barnes Elms was wonderful, and reflected the greatest credit upon the Engineer and the Contractors. The moment the Company obtained the Act of Parliament which gave them power to construct them and to issue fresh capital, they commenced; and they had already accomplished the greater part of the work. He need hardly remind the proprietors that this necessary accommodation was strenuously opposed by the London County Council, who quite needlessly put the Company to enormous expense. The object of the Council appeared to be to put every obstacle they could in the way of the Water Companies, to prevent the latter from discharging their duties; and then, if they succeeded—which they partially did in the case of the East London Company—they turned round and said that the Companies were unable to fulfil their statutory obligations. Their newest device for depreciating the Companies' undertakings was to assert that the water was impure and unwholesome. He thought, however, that they could really afford to smile at such a statement, because they knew, from the reports of the able experts who examined the water from time to time, that it was pure and wholesome; they knew that it had been pronounced to be so by a Royal Commission, who sifted this question to the bottom; and they also knew it from the fact that the death-rate in the Metropolis was lower than in those cities and towns where the supply was under the municipalities. Knowing all this, they might confidently assert that their water was both pure and wholesome; and they could assure the public that it would be maintained at the highest point of efficiency as long as the Companies had the control of the supply. The report alluded to the fact that the Metropolitan Counties Water Board Bill, introduced by the Government last session, had passed through the various stages in the House of Lords, and had been sent down to the Commons, but had not been further proceeded with. He was not in the secrets of the Cabinet; and therefore he could not tell the proprietors what the course of procedure would be, as far as this Bill was concerned, in the next session. The First Lord of the Treasury had stated publicly that the Government intended to deal with the water question; and it was possible that the Bill would be brought in again. He would only venture to prophesy that, if it was drawn on the lines of the last Bill, and the London County Council were allowed to be the predominant partner in the Water Authority, there was not very much likelihood of its passing. He must congratulate the proprietors on the passing of the Staines Reservoirs Bill, which they carried through the House of Commons in conjunction with the New River and Grand Junction Companies. The London County Council did their utmost to prevent this Bill from passing into law, and put the Companies quite needlessly to expense over it. Fortunately for the consumers, the Committee took different views; and they had the satisfaction of knowing now that they could draw from the Thames—the natural source for the water supply of Londoners—a copious amount, which would put them at their ease for some years to come. But while he congratulated them on the success achieved in getting this Bill through, after a prolonged fight, he must remind them that Parliament now imposed on all the Companies who applied for Bills the most onerous conditions. By the insertion of what was called the "sinking fund clause," they had to make a very large annual payment to the City Chamberlain. In the case of the West Middlesex Company, it was true this would not affect the interests of the stockholders. But it would fall upon the consumers in their district; and it might ultimately necessitate the withdrawal of that handsome discount of 10 per cent. which the consumers now received. It struck him as an anomaly that such a substantial benefit as this should be threatened by those who were for ever preaching the advantages of a municipal supply. It appeared, from what they read in the Press, and from what he knew as a member of the London County Council, that the Companies were not at peace, even after all this. They were threatened with another Purchase Bill. The Progressives of the London County Council, by their artificial majority, forced through the Council a Bill which was practically in the same terms as that which was thrown out of the House of Commons last session. The Directors would oppose this Bill, and do everything in their power to protect and safeguard the proprietors' interests in the matter. They were not so foolish as to maintain a dogged and defiant attitude if Parliament, in its wisdom, thought fit to pass a Bill transferring the undertakings of the Water Companies to some authority; but they would only be within their rights and privileges in insisting that there should be no confiscation, and that a fair and full price should be paid for compulsory expropriation. With regard to their staff, in Mr. Wybroo, who was responsible for the indoor department, and in Mr. Hervey, who represented the outdoor department, they had officers who had the interests of the Company entirely at heart, and who, with the whole staff of the employees, did everything they could to keep the undertaking at the highest efficiency.

The Deputy-Chairman (Mr. Jackson Hunt) seconded the motion, and it was carried unanimously.

A dividend was afterwards declared at the rate of 10 per cent. per annum on the consolidated stock for the half year ended Sept. 30, less income-tax.

A vote of thanks was then passed to the Chairman and Directors, for their diligent attention to the business of the Company.

The Chairman briefly acknowledged the vote, and the meeting terminated.

## LAMBETH WATER-WORKS COMPANY.

### The Half-Yearly Report and Accounts.

The report of the Directors of this Company for the half year ending Sept. 30, states that the accounts for this period show that during the six months 1430 houses and other supplies of water, estimated to yield an annual rental of £3387, were connected with the Company's works, as compared with 1732 houses, &c., producing a rental of £3685, laid on in the six summer months of 1895. The capital account shows an expenditure during the half year of £12,373; making since the passing of the Metropolis Water Act, 1871, a total outlay of £918,510 on new works, &c. The revenue account exhibits an increase of £6152 in the water-rents, &c., and a decrease of £9954 in the expenditure, as compared with the corresponding period last year. The accounts then included expenditure consequent on the prolonged frost the previous winter to the amount of £7728; the decrease, apart from frost expenses, is therefore £2226. The surplus transferred from the revenue account to the dividend and interest account is £77,005. There is to the credit of the latter account, after payment of interest on debenture stock, an available balance of £72,179. This amount is sufficient to pay dividends at the maximum rate on all the share capital; but, having regard to the desirability of maintaining as far as possible a uniform rate of dividend, the Directors have decided to transfer £2250 to the contingency fund, and to recommend that the maximum dividend of £7 10s. per cent. per annum be paid on the shares issued under the Company's Act of 1856, and that a dividend at the rate of £9 10s. per cent. per annum be paid on all the other share capital of the Company, less income-tax. These dividends will amount to £64,813; and a balance of £3676 will remain to be carried forward, after making provision for payments due to the Chamberlain of the City of London. Assuming that the dividends are declared as recommended, a payment of £1439 will have to be made to the Chamberlain of London under the sinking fund clause of the Company's Act of 1886 in respect of the first and second issues of the debenture stock under the Act. Constant supply was laid on to 1033 houses during the half year, and is now given

to 66,968 houses out of a total of 104,938; being 63·8 per cent. of the whole number, or 87 per cent. of the houses, &c., supplied by the Company in the Administrative County of London. The most extensive work authorized by the Company's Act of last session is the construction of additional storage reservoirs at West Molesey; and negotiations for the acquisition of the various interests in the lands required for this purpose are proceeding.

## BRISTOL WATER-WORKS COMPANY.

### Additional Capital.

An Extraordinary Meeting of this Company was held on the 14th inst.—Mr. E. BUSH presiding—for the purpose of considering a resolution authorizing the raising of additional capital by the creation, under the Company's Act of 1895, of new ordinary stock not exceeding the sum of £350,000, and issuing of the stock from time to time.

The SECRETARY (Mr. A. J. Alexander) having read the notice convening the meeting,

The CHAIRMAN said the money was mainly required for constructing the new works; and the Directors would have from time to time to raise further capital. This was not a meeting at which they could go into the accounts; but he would say that things were proceeding very well, though not perhaps quite so fast as they would wish. As to their present prospects, he need not say much. They had gone through the summer, which had been a very trying one to all water companies, very successfully, and in a way which showed the extent of their reserves. This year there had been a great addition to the house consumers—larger than ever before; and the revenue was £4000 or £5000 in excess of last year, which was not by any means a bad one. This, he thought, showed the necessity of their having additional works. He moved the first resolution, which authorized the Directors to raise £350,000, or such a nominal amount of capital as, with the premiums which might be obtained, should be sufficient to produce this sum.

Mr. H. N. ABBOT seconded the motion, which was carried.

A further resolution was passed by which the stock was consolidated with that created under the Acts of 1888 and 1889, and called 7 per cent. maximum consolidated stock.

The CHAIRMAN, replying to a question, said he thought the new works would be finished in about eighteen months or two years.

## WATER-WORKS EXTENSIONS AND IMPROVEMENTS AT LEEDS.

### Application to Parliament for Additional Powers.

The Leeds Corporation Water Committee have received a communication from the Local Government Board, intimating that they have decided to grant them the loan of £150,000 for which application was recently made.

With regard to the great water-works extension scheme which was submitted to the City Council at their meeting in October (*ante*, p. 705), the portions relating to the construction of an additional storage reservoir in the Washburn Valley, and to the provision of a new service reservoir at Alcoats Hill, Pudsey, will for the present be abandoned, although it is expected they will be proceeded with at a later date—perhaps next year. For the present, however, sanction is not to be sought for the erection of a new reservoir in the Washburn Valley, nor will the service portion of the scheme be carried beyond Cookridge. This means that no pipes will be laid between Cookridge and Pudsey, nor will the proposed reservoir be constructed at Pudsey. The remainder of the scheme—one of the principal objects of which is to make the Corporation owners of the gathering-ground of the reservoirs—will be proceeded with. It provides for the purchase of such land as may be requisite for the purpose of preventing the fouling or pollution of the existing and intended reservoirs and the streams in the Washburn Valley; the laying of pipes between the existing reservoirs in the Washburn Valley and the reservoirs at Moortown and Harehills; the acquisition of lands at Tinshill, near Adel, for the purpose of additional filter-beds; and for general powers to purchase lands, easements, and water rights, compulsorily or by agreement, for water-works purposes. One great beneficial result of the scheme will be a diminution of the cost of pumping, which in recent years has been very heavy. To carry out the scheme in its entirety would cost, according to a rough estimate, £650,000. From this estimate is now to be deducted the cost of the proposed reservoirs in the Washburn Valley and at Pudsey. This expenditure was to be extended over a period of ten years—the estimated time for construction. The interest and repayment at the present value of money would finally amount to £21,029 per annum. The surplus profit of the water-works during the present year is under-estimated at £10,000 (last year the surplus or clear profit was £14,414). The increase of this profit will certainly improve at the rate of £1000 to £1500 per annum. Adding to this income the saving of cost in pumping to the high and low levels of £7000 per year, it is contended that the work will not require any contribution from the rates.

A Special Meeting of the Leeds City Council was held last Wednesday for the purpose of considering the advisability of promoting a Bill in the next session of Parliament to empower the Corporation (among other things) to acquire certain land in the Washburn Valley for the protection of the streams, and to construct additional important works. Mr. Wilson opened the proceedings by moving a resolution declaring the expediency for the Corporation promoting the Bill. Alderman Cooke, the Chairman of the Water Committee, seconded the motion. He stated that it was proposed to postpone the construction of a new storage reservoir, as it was not an absolute requirement for one or possibly two years. The Water Committee, acting under the advice of the Consulting Engineer (Mr. G. H. Hill), their own Engineer (Mr. T. Hewson), and Mr. Symonds, had decided to modify the extent of their application for powers in the coming session for increased high-level water storage and supply, and to limit their request for powers by which the Corporation might become owners of the greater part of the watersheds and gathering-grounds of the reservoirs—in other words, to provide for the purchase of such lands as might be required for the purposes of preventing pollution of the streams in the Washburn Valley. They also asked in the Bill for permission to lay pipes between the present reservoirs in the Washburn Valley and the Harehills and Moortown reservoirs; and, further, they sought general powers to purchase lands, easements, and water rights, either compulsorily or by agreement. As they were but on the threshold of their new works, there was no necessity to define the site of the new reservoir; and the Committee, having in grateful recollection the marked expression of confidence by the Council in passing the resolution for extension, and granting, without one expression of dissent, the large amount of £650,000, were determined to reciprocate that expression by exercising the utmost caution and inquiry before committing themselves to any expenditure. Another important matter for serious consideration in selecting the actual site for the new high-level reservoir, and subordinate service reservoirs, was the present practice, as advised by their Parliamentary Agent, to insert the following clause in every Water Bill: "To make provision for the supply of water to the Urban and Rural District Councils and Parish Councils through whose districts and parishes the high-level aqueduct and the branch aqueduct will pass, and to enable such Councils to take such supply, to lay down the necessary mains and pipes, and to raise the necessary moneys." While they were willing to oblige their neighbours by selling to them as might be found convenient and desirable, such waters as they could spare, yet the important fact remained that the citizens of Leeds and their requirements must be chief creditors; and the increased high-level supply must not be tapped all along the line to supply rural authorities with water at a price which bore little or no debit of capital expenditure. Further, the modifying of the present application for parliamentary powers would remove all probable opposition on the part of rural or other authorities; and thus enable the Committee to avoid the heavy costs of witnesses and opposition—an economy very much to be desired in the interests of all concerned. The discussion did not turn to any great extent on the water provisions of the proposed Bill; and in the end the resolution was carried with only one dissentient—Mr. T. R. Leuty, M.P., who had been particularly severe in his criticisms.

## THE WATER QUESTION AT SHEFFIELD.

### The Engineering of the Little Don Scheme.

The Special Committee appointed by the Sheffield Corporation to propound an acceptable scheme for the engineering of the new water-works in the Little Don Valley adopted, last Thursday, the following, on the motion of Alderman Gainsford, seconded by Mr. Styring: "(*a*) The work to be designed and constructed under the charge and direction of an experienced civil engineer (to be called 'the Engineer'), who shall reside in the Little Don Valley or at Sheffield, and devote the whole of his time to his duties under the Corporation, and who shall have daily personal charge of the work in the Langsett Valley, and be responsible for it throughout, and shall do all special work in connection therewith which the Water Committee may desire; the staff of assistants, inspectors, draughtsmen, clerks, and others being provided by the Corporation, and under the direction of the Engineer. The Engineer shall consult with the Consulting Engineer with regard to all plans and designs, and at every step during the progress of the works, but without thereby lessening his own absolute responsibility; and he shall report direct to the Water Committee, from whom alone he will take directions. The salary to the Engineer to be from £1200 to £1500 per annum; and the engagement to be until the completion of the Langsett reservoir, subject to twelve months' notice. (*b*) Mr. E. M. Eaton to be appointed as Consulting Engineer; his duties being to confer with and advise the Engineer and the Water Committee. He shall have all designs and plans laid before him, and shall be consulted at every step of the work, and shall visit the works as often as may be needed to be thoroughly acquainted with them; but his duty and responsibility shall be only to watch carefully and thoroughly, and to advice but not to direct. He shall present a written report of his views and advice to the Water Committee at least for its meeting the first Wednesday of every month, or at any time to the Chairman of the Committee or the Town Clerk if he deems it desirable. The yearly salary or fee of the Consulting Engineer to be £500; and the engagement to be until the completion of the Langsett reservoir, subject to twelve months' notice. The Engineer (under '*a*') to be forthwith obtained. The terms and conditions above set out shall, subject as above stated, apply to the whole of the works under the Sheffield Corporation Water Act, 1896. The Consulting Engineer to be the Consulting Engineer for the existing water-works and for distribution; and the salary or fee for this to be £250 per year for the next two years."

**The Eastbourne Water Question.**—The result of the poll at Eastbourne on the proposal of the Town Council to promote a Water Bill in Parliament, showed a majority of 1174 in the Corporation favour; so the Bill will be proceeded with.

**North Tawton Water Supply.**—The Local Government Board have refused to sanction a proposed loan of £2500 for the purpose of a water supply for the parish of North Tawton, Devon, on the ground that the quantity of water derived from the existing source of supply is wholly inadequate. The Okehampton Rural District Council have accordingly decided to institute inquiries as to the possibility of augmenting the supply.

**Water Supply in the Westbury District.**—An agreement has been entered into between the Westbury Rural District Council and Lord Justice Lopes for the purchase of the necessary land for the establishment of water-works. The price for the land required, including wayleave for pipes between the proposed pumping-station and reservoir, is £500. Pumping tests show that there is an available supply of 168,000 gallons of water daily, which is more than sufficient for the supply of the town. The agreement is subject to the sanction of the Local Government Board.

## NOTES FROM SCOTLAND.

**From Our Own Correspondent.**

*Saturday.*

Mr. J. M'Gilchrist, of Dumbarton, has all but accomplished a feat which I had begun to despair of ever seeing done, in connection with the proposed transfer of the Stirling Gas Company's undertaking to the Corporation. He has acted as Valuator for both parties, practically as mediator between them, and has fixed upon the price—approximately, of course—which the Corporation are to pay to the Company. If his report be accepted, as there is every reason to anticipate that it will be, the saving to the ratepayers of Stirling will be enormous. Mr. M'Gilchrist's report is as follows:—

In terms of your instructions, I have made a careful inspection of the works, pipes, and meters supplying your burgh, and the various districts outside the burgh, with gas. I have also examined the Gas Company's balance-sheets for the last five years; and, after due consideration, I have come to be of opinion that the value of the undertaking as a going concern is £61,130. This amount does not include accounts due by consumers, cash balances, sinking fund, or the stocks of gas, coal, oil, coke, lime, tar, and ammoniacal liquor, or new fire-clay goods, or unused lead, compo, or malleable iron pipes or connections, or new malleable iron or loose tools that are in the works at the time they are handed over to the Commissioners. But it includes all pipes (except as before specified), meters, lamps, lamp-pillars, and fixed tools (whether in stock or in use) of every description, and everything else belonging to the Gas Company, including all furniture, fittings, &c. (belonging to the Company) in the offices, works, and in the manager's and foreman's dwelling-houses. The Commissioners to take over the Gas Company's contracts at contract prices, also (at a valuation) consumers' gas accounts in arrear. The Commissioners to pay all the expense connected with this valuation. The Company and Commissioners to pay one-half each of the expense connected with the valuation of the gas consumed (since last survey), consumers' gas accounts in arrears and gas in stock, and the stocks of coal, oil, coke, lime, tar, and ammoniacal liquor, new fire-clay goods, unused lead pipe, unused compo pipe, unused cast-iron pipes, unused malleable iron pipes, and unused connections, new malleable iron, and the loose tools in works. The expense of conveyancing to be borne by the Company and Commissioners in the proportion of a half each. The Company to hand over their undertaking free of debt. A convenient time for the transfer would be the second week of January, 1897, when the Company's next survey of consumers' meters takes place.

Speaking to this report in the Town Council on Monday, Mr. Govan, the Convener of the Committee in charge of the negotiations, said they proposed to adjourn consideration of the subject for a fortnight, in order that time might be given to the Councillors and the public to make up their minds upon it. They had an arrangement with the Gas Company with reference to certain matters; and any questions which might be put, must be within the lines of this arrangement. Outside of it, Mr. M'Gilchrist and the Committee would be prepared to give the fullest information. If the report were adopted, they proposed to introduce a Private Bill, with the consent of the Company. If they had proceeded under the Burghs Gas Supply Act, there would have been a year's delay and expensive costly proceedings, which, in the case of Falkirk, cost the town about £8000—£5000 for the arbitration, and £3000 for law and parliamentary charges. Mr. Govan's request for delay was agreed to. Mr. M'Gilchrist's figure seems to be a small one, when it is remembered that the price paid in the case of Falkirk was £77,000; but there are circumstances which modify first impressions. First, the capital in Stirling is only £15,000; whereas in Falkirk it was £50,000. Then the works in Stirling are old, and will require a large expenditure upon them; and, further, Stirling cannot be expected to have the same expansion as Falkirk. There are said to be 7400 shares in the Stirling Gas Company issued, which would make about £2 per share paid up; and the price proposed gives a return to the holders of about £8 5s. per share, which is about the current market value. From another point of view, the price is seen to be a fair one. The output of gas is about 61 million cubic feet a year; and the price suggested is thus practically £1000 per million cubic feet. We had it from Mr. Newbigging, in his evidence in the recent Dunfermline arbitration, that there are 49 gas companies in Scotland whose capital ranges from £900 upwards per million feet; and that Dunfermline worked out to £1074. The profit in Stirling is reported to be not less than £2400 a year; and if the total cost to the Corporation were £65,000; and they were to borrow money at 3 per cent., the annual charge would be £1950, which would leave a profit balance of £450 a year. In this view, the Corporation should be able to pay more than £61,000; but I have no doubt that all these considerations were taken account of by Mr. M'Gilchrist. It speaks volumes for his tact and intelligence that he has been able to bring the two bodies together, and to get them virtually to agree. Such an experience does not often fall to be recorded; but when it does, it is all the greater pleasure, on account of its rarity, to give credit for it.

There has been another accident at the Forfar Corporation Gas-Works—this time of no great proportions, and involving no injury to life or limb. On Friday of last week, the floor of a shed over the purifier-house, upon which there was about 20 tons of oxide, gave way and fell on one of the purifiers. The Corporation held their monthly meeting on Monday; and they resolved to have a special meeting in the gas-works on Wednesday afternoon, to investigate the subject, and also to consider the complaints as to the bad quality of the gas, which have been rife of late. Mr. Craik, Convener of the Gas Committee, said he could not shut his ears to the complaints made with reference to the bad quality of the gas. Mr. Christie reminded the Corporation that, when they were last settling their coal contracts, he protested against the use of so much inferior coal, because he was convinced that they could not make good gas from it. Gas consumers, he considered, were simply being defrauded—the gas bills were growing bigger and bigger, and the quality of the gas was getting worse. He suggested that they should obtain at once 200 or 300 tons of cannel coal. Mr. Craik replied that the coal which they were using was not cheap, but was of about the average price paid in other gas-works. His own opinion was that the Manager (Mr. Waddell) was too anxious to obtain good results at small cost. At the meeting in the works on Wednesday, Mr. Waddell explained that he had been using a larger proportion of Leven cannel of late, which was the richest coal they had; but that he had been troubled with carbonic acid gas impurity. It was probably a freak of the purifiers. The average price of the coal he was using was 15s. 9d. per ton. Mr. Christie said that in Mr. Esplin's time they paid 24s. 11d. for Niddrie No. 1 cannel, and got good gas; and he thought they should order a quantity of this coal, to try to overcome the existing evil. He believed that Mr. Waddell had being going in for shale coal. The remarks of the company then turned upon the proportions of lime and oxide which were used. Mr. Waddell said he believed he had been using too much oxide. It transpired that the Corporation get the oxide free; and after working it up to a certain standard, they send it back. The oxide in this case had been seven months in the purifier. It was ultimately resolved to get a quantity of Niddrie cannel. Then, as to the accident, one of the Councillors reported that he had examined the broken material shortly after the occurrence; and he found that the bracket was not solid, and had been burned. Mr. Waddell was instructed to have the damage made good, and the shed strengthened, at a probable cost of about £15. In the course of the discussion upon the two subjects, there was a good deal of remark as to the Manager's responsibility for the defects, particularly for the impure gas. Mr. Waddell has certainly been most unfortunate; but what encouragement has he ever received? His scheme of improvements at the works was cut down; and he has worked all along under a disadvantage. Still, I think it will be impossible to exonerate him in the matter of the poor quality of the gas. The production and the purification of gas is his particular work; and if he was finding difficulty in it, he should have been the first to speak out, and not have waited till the public made an outcry over the matter. Had he done so, and shown that the trouble he had was a reasonable and genuine one, he would have disarmed criticism. He is satisfied that he has overcome the difficulty now, because, I suppose, he will use more lime, to extract the carbonic acid; and then the Niddrie coal which is being thrust upon him may be freer of carbonic acid than that which he has been using. But a report to that effect to his Committee, would have been better than allowing the Commissioners to take it out of him by examination. The thought arises in my mind, which did not appear to be considered by anyone—What about the oxide? Has it been tested as to its capacity for dealing with the coal used in Forfar? If not, this should be seen to at once; but it is so obvious a thing to do, that I can scarcely think it could have been overlooked.

The Renfrew Corporation Gas-Works, which are managed by Mr. T. Lighbody, are flourishing. Last year there was an output of gas amounting to 14,335,900 cubic feet—an increase of 2,250,000 cubic feet over the preceding year. The gas accounted for rose from 89 to 91 per cent.; and the gas made per ton of coal, from 8956 to 9207 cubic feet. The revenue amounted to £3109, of which £390 was a balance from the previous year, £2374 was received for gas sold, £174 for tar and ammoniacal liquor, and £128 for coke. There was a balance of £812. The sinking fund now stands at £1971, and the capital account at £8495. Of the latter sum, there was expended during the year £881 upon a new gasholder, new governor, and other extensions, and £580 upon a new main; all these works having been carried out to plans and specifications prepared by Mr. Lighbody. The price of gas has been reduced by 5d. per 1000 cubic feet—making a total reduction of 8d. in two years. The town is growing so rapidly that further extensions of works will soon be necessary.

Two cases of poisoning by gas occurred this week. In one, a gasman in the employment of the British Tube Works, at Coatbridge, was found lying in the works in an unconscious condition. He had been seen about a minute previously, when there was nothing apparently the matter with him. In spite of restoratives which were used, the poor man died. It is not stated, but it looks as if the incident was due to poisoning by water gas. The other case occurred at Blantyre, and was caused by a road-roller having snapped the service-pipes in front of a row of workmen's houses. Three families were affected by the gas penetrating into their houses during the night; but they have all since recovered.

In the Glasgow Town Council on Thursday, Mr. Mitchell, the Convener of the Gas and Electric Lighting Committee, replying to a question, said there were 2706 men on the roll of the works; and of these there were a number who received 19s. a week for working from eight in the morning till four in the afternoon. He thought the wage was more than was usually paid to men who were similarly employed. Mr. Morrin, a labour member, who raised the question, wanted to know whether the Committee would take into consideration the case of those men who were working for less than £1 a week; and Mr. Mitchell said he was quite prepared to do so. Subsequently, when it was proposed by the same Committee that two of the Assistant Engineers in the gas-works should have their salaries raised from £200 to £225—the Committee's reason for the increases being that the gentlemen named were now making about a third more gas than formerly, and were on duty every day, including Sundays—Mr. John Ferguson developed some heat by an objection which he took to any increases being given to gentlemen earning £200 a year, until the Corporation were in a position to say that no man was in their employ at a less wage than 21s. per week. The increases were agreed to by a large majority.

I mentioned two weeks ago the unsatisfactory nature of the electric lighting of St. Andrew's Hall, Glasgow. It would appear that there is another objection to the lighting, beyond what I stated—namely, that the lights give out unpleasant hissing sounds, to the great distraction of singers and players. The subject was mentioned at the Town Council on Thursday; and Mr. Pettigrew, who has charge of the work, stated that the installation was still in an incomplete state, and that before it was taken off the contractors' hands it would be thoroughly efficient.

The Corporation of Edinburgh on Tuesday approved of the second resolution which is necessary for the adoption of the Burghs Gas Supply Act. They have also issued their parliamentary notice of the Bill which they are about to promote, one of the objects of which is to give the Edinburgh and Leith Gas Commissioners power to take over the gas undertaking in Portobello. I cannot help thinking that this is "a backward progression." Could, for example, the Corporation of Edinburgh promote a Bill to empower the City of Glasgow to amalgamate with the burgh of Govan?

Sheriff Campbell Smith, in Dundee, has decided an action as to the

removal of gas-fittings from a shop by the outgoing tenant. The proprietor of the building at one time carried on business in the premises. But some years ago he sold his business to the defender; and the defender, when he left, took away the gas-fittings with him. The proprietor sued for £5 15s. 6d. as damages. The Sheriff said that, as the gas-fittings were not included in the statement of the stock-in-trade, it was absurd to think the defender had a right to remove them; or that he as tenant was to be allowed to dismantle the gas-fittings and make the place useless as a workshop, necessitating the expenditure of two or three times their value to refit them. According to his understanding, if a tenant went into a house and found gas-fittings there, he was bound to leave them. He had no more right to them than a thief who might go in. He took the house, and had to give it up as he got it, or as near as possible as he got it. He had no more right to take away the fittings than he had to remove the keys, the locks of the doors, or to take out the windows, and carry them away. What he considered would be a fair arrangement, was to allow the pursuer £5, with 7s. expenses.

## CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Nov.* 21.

**Sulphate of Ammonia.**—The week opened quietly at previous quotations; but it soon became evident that speculative buying had ceased. At the same time, it was seen that the extensive buying had not been altogether for "covering," but partly for an advance; the symptom of weakness bringing out several parcels in second hands. Had the direct demand of the previous week continued, it would doubtless have been sufficient to remove all second-hand offerings; but consumers too immediately took the hint and withdrew. Hence it has only been possible to effect sales at reduced prices; the decline being altogether fully 5s. per ton all round. The closing quotations are for re-sales £7 12s. 6d. to £7 15s. per ton, f.o.b. Leith, Hull, and Liverpool; and these must at the moment be considered the market values. The larger makers, having disposed of the bulk of their production for the month and partly for December, have mostly remained firm; only a few of the smaller makes having been put on the market at the decline. For delivery ahead, Scotch makers still ask £8 10s. to £8 15s. per ton, according to position (delivery first half of next year); but dealers are again offering abroad spring delivery at equal to £7 7s. 6d.

**Nitrate of Soda** is rather quieter, but 8s. per cwt. remains the price for fine quality on spot. Due cargoes are worth about 7s. 9d. per cwt.

LONDON, *Nov.* 21.

**Tar Products.**—There is a growing lassitude in this market. Pitch buyers, apparently, have conspired to refrain from purchasing, so as to throw stocks into distillers' hands; but, the increased price being asked for coal is more than likely to have a beneficial effect upon the position of pitch, of which stocks at present in producers' hands are low and unimportant. Benzol is weaker; and although consumers are pressing for deliveries on old contracts, there is no demand for new business. Makers are undoubtedly well sold, and very little benzol of any kind is being offered. But the market undoubtedly has a tendency to weakness—more especially for next year's delivery. There is continued firmness in tar acids, which are for the moment scarce. Naphthalene is in good request at firmer rates; while anthracene is held firmly by the Committee at former rates.

Business has been done during the week at an average of the following prices: Tar, 18s. 6d. to 26s. Pitch, 26s. to 28s. 6d. Benzols, 90's, prompt, nominal, 4s.; forward, 3s. 9d.; 50's, prompt, nominal, 3s.; forward, 2s. 9d. Solvent naphtha, prompt, 1s. 6d.; forward, 1s. 4d. Crude 30 per cent. naphtha, prompt, 1s. 5d.; forward, 1s. 2d. Creosote, 1½d.; liquid, 2¾d. Heavy oils, 40s. Naphthalene, 65s.; salts, 32s. 6d. Cresylic acid, 10d. Carbolic acid, 60's, 2s. Anthracene, "A," 10½d. "B," 8½d.

**Sulphate of Ammonia** is not quite so strong. A determined effort is being made to depress the price. It is hoped that makers will not lend themselves to the tactics of interested dealers. To-day's values are £7 12s. 6d. to £7 17s. 6d., less 3½ per cent., at the various ports.

## COAL TRADE REPORTS.

**From Our Own Correspondents.**

**Lancashire Coal Trade.**—The improvement in the coal trade here is well maintained. A satisfactory weight of business comes forward generally, with pits working five to six days per week; and the output, so far as the better qualities of round coal are concerned, moves away freely. Steam and forge coals meet with a fair inquiry; but there is no actual pressure for supplies, and prices have not improved to any extent. Engine fuel shows some variation; the better sorts being in good demand, with supplies rather scarce, if anything. Prices, however, are maintained at late rates. At the pit mouth, best Wigan Arley now averages 10s. 6d. to 11s. per ton; Pemberton four-feet and seconds Arley, 8s. 6d. to 9s.; steam and forge coals, 6s. 6d.; and engine fuel from 3s. 6d. for common to 4s. 6d. and 5s. for best descriptions. The shipping trade continues active, with the advanced prices readily obtainable; 7s. 9d. to 8s. 3d. per ton being the average for good ordinary steam coal, delivered at the Mersey ports.

**Northern Coal Trade.**—There is deeper dulness in the steam coal branch of the Northern coal trade in the last few days; for the upper Baltic ports have now ceased for the season to take coals, and some of the Northumbrian collieries are obliged to work short time in consequence of the diminished demand. Best Northumbrian steam coals are quoted at 7s. 7½d. per ton f.o.b.; and second qualities, at 7s. 3d. Manufacturing coals vary in price; but generally the contracts that are being made for next year show a slight improvement in price on this year's contracts, though it is limited to pence. Gas coals are firm; but though the quotations are steadier, it is for a comparatively small quantity, for the greatest part of the output is taken up by the contracts. For the single cargoes that are sold, about 7s. per ton f.o.b. is the average quotation. There is little alteration in the gas coke trade. The output is now very large; and it is difficult to keep down the stocks at some of the works. The household consumption of coke, however, seems increasing. Prices are unaltered this week.

**Scotch Coal Trade.**—There is little change to record. Prices and

## GAS AND WATER COMPANIES' STOCK AND SHARE LIST (see ante, p. 1011.)

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p. c. | GAS COMPANIES. | | | £ s. d. |
| 590,000 | 10 | 15 Oct. | 10½ | Alliance & Dublin 10 p. c. | 23–25 | .. | 4 4 0 |
| 100,000 | 10 | ,, | 7½ | Do. 7 p. c. | 17½–18½ | .. | 4 1 1 |
| 300,000 | 100 | 1 July | 5 | Australian (Sydney) 5% Deb. | 107–110 | +1 | 4 10 11 |
| 200,000 | 10 | 29 Oct. | 5 | Belgrano (B. Ayres), Limited | 10¼–11 | .. | 4 10 11 |
| 100,000 | Stck. | 26 June | 5 | Do. 5 p. c. Deb. Stk | 102–105 | .. | 4 15 3 |
| 200,000 | 5 | 12 Nov. | 6½ | Bombay, Limited | 7½–8* | .. | 4 1 3 |
| 40,000 | 5 | ,, | 6½ | Do. New, £4 paid | 5¾–6¼* | +¼ | 4 3 2 |
| 380,000 | Stck. | 13 Aug. | 12 | Brentford Consolidated | 285–290 | .. | 4 2 9 |
| 210,000 | ,, | ,, | 9 | Do. New | 215–220 | .. | 4 1 9 |
| 50,000 | ,, | ,, | 5 | Do. 5 p. c. Pref. | 140–145 | .. | 3 9 0 |
| 159,375 | ,, | 12 June | 4 | Do. 4 p. c. Deb. Stock. | 130–134 | .. | 2 19 9 |
| 220,000 | Stck. | 16 Sept. | 11½ | Brighton & Hove Original | 242–247 | .. | 4 13 1 |
| 208,820 | ,, | ,, | 8½ | Do. A Ord. Stk. | 185–190 | .. | 4 9 5 |
| 933,500 | Stck. | 28 Aug. | 5 | Bristol, 5 p.c. max. | 127–132 | .. | 3 15 9 |
| 420,000 | 20 | 15 Oct. | 11¼ | British | 55½–56½ | –½ | 3 19 7 |
| 50,000 | 10 | 28 Aug. | 11½ | Bromley, Ordinary 10 p. c. | 22–23 | .. | 5 0 0 |
| 71,000 | 10 | ,, | 8½ | Do. 7 p. c. | 19–20 | .. | 4 5 0 |
| 500,000 | 10 | 15 Oct. | 6 | Buenos Ayres (New) Limited | 10½–11 | .. | 5 9 1 |
| 200,000 | 100 | 1 July | 6 | Do. 6 p. c. Deb. | 103–106 | .. | 5 13 2 |
| 150,000 | 20 | 15 July | 8½ | Cagliari, Limited | 29–31 | .. | 5 6 5 |
| 100,000 | 10 | 30 Sept. | 6 | Cape Town & District, Ltd. | 16½–17½ | .. | 3 8 8 |
| 50,000 | 50 | 3 Nov. | 6 | Do. 6 p. c. 1st Mort. | 57–59 | .. | 5 1 8 |
| 550,000 | Stck. | 15 Oct. | 13½ | Commercial Old Stock | 333–343 | .. | 3 18 8 |
| 165,000 | ,, | ,, | 10½ | Do. New do. | 255–260 | .. | 4 0 9 |
| 165,000 | ,, | 12 June | 4½ | Do. 4½ p. c. Deb. do. | 152–157 | .. | 2 17 3 |
| 800,000 | Stck. | 12 June | 13 | Continental Union, Limited. | 278–283 | .. | 4 11 0 |
| 200,000 | ,, | ,, | 10 | Do. 7 p. c. Pref. | 220–225 | .. | 4 8 11 |
| 51,6 0 | Stck. | 28 Aug. | 14 | Croydon Com'cial A 10 p. c. | 315–320 | .. | 4 7 6 |
| 163,400 | ,, | ,, | 11 | Do. B 7 p. c. | 250–255 | .. | 4 6 3 |
| 535,000 | Stck. | 28 Aug. | 5¼ | Crystal Palace Ord. 5 p.c. Stk | 140–143 | .. | 3 13 5 |
| 60,000 | ,, | ,, | 5 | Do. 5 p. c. Pref. | 140–145 | .. | 3 9 0 |
| 436,090 | 10 | 15 July | 11 | European, Limited | 26–27 | .. | 4 1 6 |
| 354,060 | 10 | ,, | 11 | Do. £7 10s. paid | 18–19 | .. | 4 6 11 |
| 5,746,590 | Stck. | 13 Aug | 12¾ | Gaslight & Coke, A, Ordinary | 316–321 | –1 | 3 19 5 |
| 100,000 | ,, | ,, | 4 | Do. B, 4 p. c. max. | 110–115 | .. | 3 9 7 |
| 665,000 | ,, | ,, | 10 | Do. C, D, & E, 10 p.c. Pf. | 305–315 | .. | 3 3 6 |
| 30,000 | ,, | ,, | 5 | Do. F, 5 p. c. Prf. | 147–152 | .. | 3 5 9 |
| 60,000 | ,, | ,, | 7½ | Do. G, 7½ p. c. do. | 212–217 | .. | 3 9 1 |
| 1,300,000 | ,, | ,, | 7 | Do. H, 7 p. c. max. | 207–212 | .. | 3 6 0 |
| 463,000 | ,, | ,, | 10 | Do. J, 10 p. c. Prf. | 305–315 | .. | 3 3 6 |
| 476,000 | ,, | ,, | 6 | Do. K, 6 p. c. Prf. | 172–177 | .. | 3 7 10 |
| 1,061,150 | ,, | 12 June | 4 | Do. 4 p. c. Deb. Stk. | 138–143 | .. | 2 15 11 |
| 294,850 | ,, | ,, | 4½ | Do. 4½ p. c do. | 150–155 | .. | 2 18 0 |
| 908,000 | ,, | ,, | 6 | Do. 6 p. c. do. | 207–212 | .. | 2 16 7 |
| 70,000 | 10 | 29 Oct. | 6 | Hongkong & China Limited | 12–13 | .. | 4 12 4 |

| Issue. | Share. | When ex-Dividend. | Dividend or Dividend & Bonus. | NAME. | Closing Prices. | Rise or Fall in Wk. | Yield upon Investment. |
|---|---|---|---|---|---|---|---|
| £ | | | p. c. | GAS COMPANIES. | | | £ s. d. |
| 3,820,000 | Stck. | 12 Nov. | 12 | Imperial Continental | 272–277* | .. | 5 5 9 |
| 376,400 | 100 | 1 Aug. | 4 | Do. 4 p. c. Debs. Red. | 100–103 | .. | 3 17 8 |
| 473,600 | Stck. | 13 Aug. | 3½ | Do. 3½ p. c. Deb. Stk | 108–110 | .. | 3 3 8 |
| 75,000 | 5 | 26 June | 6 | Malta & Mediterranean, Ltd. | 6–6½ | .. | 4 12 4 |
| 560,000 | 100 | 1 Oct. | 5 | Met. of Melbourne, 5p. c. Deb. | 109–113 | +1 | 4 8 6 |
| 250,000 | 100 | ,, | 4½ | Do. 4½ p. c. Debs. | 108–110 | .. | 4 1 10 |
| 541,920 | 20 | 12 Nov. | 5 | Monte Video, Limited | 16–17* | .. | 5 17 8 |
| 150,000 | 5 | 29 May | 8 | Oriental, Limited | 8¾–9¼ | .. | 4 6 6 |
| 135,000 | 5 | ,, | 8 | Do. New, £4 10s. paid | 7¼–8¼ | .. | 4 7 3 |
| 15,000 | 5 | ,, | 8 | Do. do. 1879, £1 paid | 1½–2 | .. | 4 0 0 |
| 60,000 | 5 | 16 Sept. | 7 | Ottoman, Limited | 5–5½ | .. | 0 7 3 |
| 420,000 | 100 | 2 Nov. | 6 | People's Gas } 1st Mtg. Bds. | 102–107 | .. | 5 12 1 |
| 500,000 | 100 | 1 June | 6 | of Chicago } 2nd Do. | 102–107 | .. | 5 12 1 |
| 250,000 | 10 | 30 Sept. | 10 | San Paulo, Limited | 13–14 | .. | 7 2 10 |
| 5,475,000 | Stck. | 13 Aug. | 5 5/16 | South Metrop., 4 p.c. Ord. | 144–148 | +1 | 3 10 3 |
| 820,000 | ,, | 15 July | 5 | Do. 5 p. c. Deb. Stk. | 171–174 | .. | 2 17 6 |
| 60,000 | Stck. | 16 Sept. | 11½ | Tottenham & Edmonton, A | 270–280 | .. | 4 2 3 |
| 60,300 | ,, | ,, | 8½ | Do. B | 180–190 | .. | 4 9 5 |
| 170,380 | 10 | 29 May | 10 | Tuscan, Limited. | 13½–14½ | .. | 6 18 0 |
| 149,900 | 10 | 1 July | 5 | Do. 5 p. c. Debs. Red. | 101–103 | .. | 4 17 1 |

### WATER COMPANIES.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 746,123 | Stck. | 26 June | 10½ | Chelsea, Ordinary | 338–343 | .. | 2 19 9 |
| 150,000 | ,, | ,, | 5 | Do. 5 p. c. Pref. | 177–182 | .. | 2 14 11 |
| 160,000 | ,, | ,, | 4½ | Do. 4½ p. c. Pref. Stk., 1875 | 160–164 | .. | 2 14 10 |
| 175,783 | ,, | 30 Sept. | 4½ | Do. 4½ p. c. Deb. Stock | 162–167 | .. | 2 13 11 |
| 1,719,514 | Stck. | 15 Oct. | 7 | East London, Ordinary | 222–227 | .. | 3 1 7 |
| 654,740 | ,, | 26 June | 4½ | Do. 4½ p. c. Deb. Stk. | 163–168 | .. | 2 13 7 |
| 225,000 | ,, | ,, | 3 | Do. 3 p. c. Deb. Stk. | 105–107 | .. | 2 16 1 |
| 700,000 | 50 | 12 June | 7½ | Grand Junction, 10 p.c. max. | 113–118 | .. | 3 3 6 |
| 295,000 | Stck. | 30 Sept. | 4 | Do. 4 p. c. Deb. Stk. | 150–155 | .. | 2 11 7 |
| 708,000 | Stck. | 13 Aug. | 12 | Kent | 335–345 | .. | 3 9 7 |
| 160,000 | ,, | ,, | 7 | Do. New, 7 p. c. max. | 215–220 | –2 | 3 3 7 |
| 1,043,800 | 100 | 26 June | 9½† | Lambeth, 10 p. c. max. | 272–277 | +5 | 3 8 7 |
| 406,200 | 100 | ,, | 7½ | Do. 7½ p. c. max. | 225–230 | .. | 3 5 2 |
| 350,000 | Stck. | 30 Sept. | 4 | Do. 4 p. c. Deb. Stk. | 150–153 | .. | 2 12 3 |
| 500,000 | 100 | 13 Aug. | 12 5/16 | New River, New Shares | 418–423 | .. | 3 1 0 |
| 1,000,000 | Stck. | 30 July | 4 | Do. 4 p. c. Deb. Stk. | 150–155 | .. | 2 11 7 |
| 902,300 | Stck. | 12 June | 4 | S'thwk & V'xhall, Ordinary | 154–159 | .. | 2 10 4 |
| 126,500 | 100 | ,, | 4 | Do. Do. 7½ p. c. Max. | 148–153 | .. | 2 12 3 |
| 489,200 | Stck. | ,, | 5 | Do. Do. 5 p. c. Pref. | 175–180 | .. | 2 15 6 |
| 1,019,585 | ,, | 30 Sept. | 4 | Do. 4 p. c. A Deb. Stk. | 148–152 | .. | 2 12 7 |
| 1,155,056 | Stck. | 12 June | 10 | West Middlesex | 318–323 | .. | 3 1 11 |
| 200,000 | ,, | ,, | 4½ | Do. 4½ p. c. Deb. Stk. | 165–170 | .. | 2 12 11 |

† Next dividend will be at this rate. *Ex div.

demand remain the same. Among the men, there is an agitation for a further advance of 6d. per day; and there is every reason to believe that it will be granted in many instances. The Fife coalmasters have refused to give the first advance, as, on account of their trade being chiefly export, and that branch of business not being improved, they consider that an advance is not warranted. The prices quoted are: Main, 6s. 3d. to 6s. 6d. per ton f.o.b. Glasgow; and ell, 6s. 9d. to 7s. The shipments for the week amounted to 150,159 tons—a decrease, on the quantity in the preceding week of 8505 tons, but an increase over the corresponding week of last year of 2068 tons. For the year to date, the total shipments have amounted to 6,816,878 tons—an increase upon the quantity in the same period of last year of 214,662 tons.

**Death from Gas Poisoning.**—A servant, named Jessie Proudfoot, who was found poisoned by an escape of gas at Claverton View, Bath, last Saturday morning, died during the following night without regaining consciousness. Her mistress, Miss Decent, who was overcome, remains in a precarious condition. It appears that a chandelier was drawn down too low on Thursday night, and the escaping gas filled the house.

**New Joint-Stock Companies.**—The Leatherhead Gas Company, Limited, has been registered with a capital of £10,000, in £10 shares, of which 965 have been taken up and paid for in full. The Company was originally constituted by deed of settlement in 1850, and was registered under the Joint-Stock Companies Act in 1856. The Sedbergh New Gas Company, Limited, with a capital of £12,500, in £5 shares, is to acquire the undertaking of the Sedbergh Gas and Coke Company, and to carry on the business of lighting with gas the township of Sedbergh, in the West Riding of York.

**The Gas-Works Purchase Question at St. Anne's.**—A deputation representing the St. Anne's Ratepayers' Association have been acquiring information in regard to the proposed compulsory acquirement of the local gas undertaking by the Urban District Council. They interviewed, among others, Mr. Woodcock, the Solicitor to the Gas Company, and obtained certain important information. The Company's Parliamentary Agents state that the concern is in the happy position of having unlimited borrowing powers. The 4 per cent. debenture holders, according to Mr. Woodcock, cannot be paid off at par, nor will they accept 3 per cent. bonds as suggested by the Engineer for the Council (Mr. E. H. Stevenson). Mr. Woodcock also added that there would be difficulties in dealing with the 7 per cent. and 10 per cent. preference shareholders, who had invested with the view of having their dividend in perpetuity. The deputation likewise interviewed the members of the District Council, and were informed that the Engineer's report as to the illegal borrowing by the Company had been confirmed by Counsel. The Council maintained that it was to the best interests of the town for the works to be acquired by the ratepayers. The deputation were given to understand that, after compulsory powers of purchase had been obtained, and the arbitrators' award given, the Council could not withdraw if they considered the sum too high.

**Sales of Gas Stock.**—At Bolton, last Wednesday, £100 of consolidated "A" stock of the Farnworth and Kearsley Gas Company, sold by public auction for £250; and a similar parcel, put up immediately afterwards, realized £252 10s. £160 of the same stock fetched £400. On the following day, six parcels of £100 of preference stock in the Oxford Gas Company realized £136 each; similar quantities of ordinary stock averaging £131 each.

**Proposed New Gas-Works at Padiham.**—At the monthly meeting of the Padiham District Council last Thursday, Mr. Simmonds, the Engineer, submitted plans for the proposed new gas-works to be constructed by that authority. After consideration, it was resolved that Mr. Simmonds should be requested to prepare an estimate of the cost of works to produce 500,000 cubic feet of gas per day, and also to estimate the additional cost if the retort-house were built of a height suitable for inclined retorts.

**The Weymouth Corporation and the Gas and Water Companies.**—The Weymouth Gas and Water Companies have both notified their intention of applying to Parliament for extended powers and more capital. In view of the fact that for some years past there has been a strong feeling in the Town Council in favour of acquiring the undertakings of both Companies, a special meeting of that body has been held, at which the following resolution was unanimously passed: "That the Town Clerk be instructed to take the necessary steps to oppose the application of the Weymouth Water Company and the Weymouth Consumers' Gas Company, intended to be made to Parliament in the ensuing session for additional powers; and, further, that he be instructed to communicate with these two Companies with a view of ascertaining the terms upon which the Council can acquire these several undertakings, and to inform the Council at the earliest possible date the result of these communications, so that the Council may, if necessary, take steps to obtain compulsory powers to purchase, and apply to the Local Government Board for their sanction so to do."

**Northam Water Supply.**—Another long discussion upon the question of water supply took place at a recent meeting of the Northam District Council. A year ago, Mr. Baldwin Latham prepared a scheme for the supply of the district by gravitation; but this was not adopted on account of the cost. Subsequently, a pumping scheme was considered, and was also put on one side. Mr. Latham now wrote to point out that his scheme could be modified; and that, in any event, a pumping scheme would necessitate a larger annual outlay than a gravitation one. Several suggestions were put forward as to the line of action which should be taken. Some members of the Council were in favour of inviting Mr. Latham to a conference; while others suggested that competition should be invited for a satisfactory scheme of water supply. The latter suggestion was put in the form of a resolution; but the voting upon it was equal, and the Chairman (who said he was tired of the whole matter) declined to give his casting vote upon it. A letter was received from the Local Government Board; and it was decided to reply that the question was under consideration, but no conclusion had been arrived at—an answer which the Clerk said had been made to several previous inquiries.

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|---|---|
| H. . . . . | 25½ inches. |
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**Gas-Engines at Halifax.**—At Halifax there are now 250 gas-engines connected to the Corporation gas supply; and the number is still steadily increasing.

**The Proposed Municipalization of the Lowestoft Gas and Water Works.**—Last Friday evening, a public meeting of ratepayers was held at Lowestoft in connection with the resolution, referred to last week, to municipalize the gas and water works. Only a few hands were held up against the proposal; but a poll was demanded.

**Reduction in the Price of Gas at Wells.**—The City of Wells Gaslight Company have just reduced the price of gas 3d. per 1000 cubic feet; thus making it 3s. 6d. The charge nine years ago, when Mr. C. V. Bennett, the present Secretary and Manager, was appointed, was 4s. 6d. The prosperous state of the Company enabling them to sell at the lower price is in great measure due to the increased consumption consequent upon Mr. Bennett's efforts in pushing the sale of gas for heating and cooking as well as for lighting purposes.

**Fire at the Works of the Sunlight Incandescent Gas Company.**—A fire, by which three persons were badly burned, occurred soon after four o'clock on Monday afternoon last week, on the premises of the Sunlight Incandescent Gas Company, Woodstock Street, Oxford Street. The outbreak occurred from an unknown cause in the workshops in the front part of the basement, where a number of mantles became ignited. Three women were badly burned, and had to be removed in cabs to the Middlesex Hospital. Firemen were promptly in attendance; and they were successful in overcoming the flames, though not without difficulty.

**The Newcastle Gas Company and "Penny-in-the-Slot" Meters.**—The recent decision of the Newcastle-upon-Tyne and Gateshead Gas Company not to introduce automatic prepayment meters has called forth a remonstrance from a Mr. W. C. Thomas, who has expressed his views on the matter in a letter to a local paper. The reason adduced by the Company—viz., that there is no demand for these meters—seems to the writer to be ridiculous. He points out that if the inhabitants of a whole neighbourhood know that a certain shop does not keep some particular article, they are not likely to go there for it; and so it is, he says, with the Gas Company. Everybody knows that they do not stock "penny-in-the-slot" meters, and consequently there is no demand for them. Mr. Thomas says there are thousands of people eagerly awaiting the introduction of these meters; and he thinks their supply cannot fail to be remunerative to the Company. He cites Tunstall in support of his opinion. There was at one time no demand for these meters there; but the British Gaslight Company saw the possibility of increasing their revenues by their introduction, and, like sensible people, they embraced it, with the result that their finances have greatly improved. Mr. Thomas is strong on the point that the fact of the penny not being missed makes prepayment meters such welcome additions to the houses of small shopkeepers and families of limited means; and, on their behalf, he expresses the hope that the Company may see their way to changing what he characterizes as a shortsighted policy.

**The Proposed Water Trust for West Kent.**—At a special meeting of the Bromley Urban District Council held last week, a formal resolution, pledging the Council to take part in the promotion of a Bill for the constitution of a Water Trust, the cost of which would in the first instance be defrayed out of the general district rate, and ultimately out of moneys to be borrowed in the promotion of the scheme, was submitted by the Chairman (Mr. D. Grinsted), and carried, but not by a sufficient majority to allow of its being acted upon. A meeting of ratepayers called for Friday evening to confirm the resolution had therefore to be abandoned.

**Serious Gas Explosions at Southbank.**—Last Tuesday evening a series of explosions of gas took place in one of the poorest quarters of Southbank, by which a number of persons were injured and dwelling-houses wrecked. During the day a heavy steam-roller was working in the neighbourhood; and it is supposed that damage was done to one of the gas-mains—the escaping gas finding its way into the houses. Upwards of a dozen families had to leave their homes for fear of further explosions; and it was thought advisable to cut off the supply of gas to the whole district for the night. The District Council have considered it to be their duty to inform the Local Government Board of the occurrence; and they have also appointed a Committee to report upon the matter. The injured persons are reported to be progressing very satisfactorily.

**The Gas-Works Purchase Question at Malvern Link.**—A meeting of the ratepayers of Malvern Link was held yesterday week for the purpose of considering the advisability of authorizing the District Council to promote a Bill in Parliament to enable them to acquire the gas-works. The chair was taken by Lieut.-Col. Ottley, who, in opening the proceedings, said the question of purchasing the gas-works was not a new one. Several years ago it was discussed; but there was then no chance of coming to terms. Now they had an opportunity of purchasing the works, but no price had been named. If they obtained parliamentary powers the purchase would be by arbitration; and he was advised that powers would be readily granted, as it was a parliamentary principle that public works should be held by public bodies. He was sure the ratepayers would gain great advantage by the purchase of the works. He therefore moved the necessary resolution. The motion having been seconded, Mr. Lloyd moved an amendment deferring the discussion until it was known whether or not the Local Government Board would grant the Malvern Council the right of purchasing the Link works. He considered that as Malvern had an Act for supplying the district with gas, it would be putting the ratepayers to unnecessary expense to adopt the course now suggested. The amendment was also seconded. Mr. Tyler said it was true Malvern had had the power of supplying the district with gas for upwards of forty years; but they had taken no action to put that power into operation till the Link moved in the matter. He hoped the Link Council would fight them on this matter, as they had fought them on the water question. Several speakers addressed the meeting in support of the motion, which was eventually carried by a considerable majority.

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"QUEEN" GAS-FIRE.

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LISTS, ON APPLICATION, FROM

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THE OLDEST AND LARGEST GAS-STOVE MAKERS IN THE WORLD.

Meetings have been called to receive accounts of the voluntary winding up of the Holyhead Gas Company and the 1894 Tar Products Sales Committee, Limited.

The numbers are announced of 5 per cent. debentures amounting to £4600, of the Monte Video Gas Company, which have been drawn for payment at par on Jan. 1.

The tender of Messrs. C. Isler and Co. for sinking an artesian bore well, 11½ inches internal diameter and 400 feet deep, for the new water-works for Southborough, for £784, has been accepted.

We have received a copy of the first number of the "Architectural Review," a high-class monthly publication for artists, architects, and draughtsmen. It is accompanied by a plate portrait of Mr. J. L. Pearson, R.A., to whose work the first article is devoted.

The Acetylene Illuminating Company, Limited, of 63, Queen Victoria Street, have issued a pamphlet on carbide of calcium and acetylene gas. It contains general comments on the gas and its value for lighting; also a report by Professor Vivian B. Lewes, on the subject.

We are informed by the Secretary (Mr. W. H. Brothers) that the offices of the British Association of Water-Works Engineers—at present at Palace Chambers, Bridge Street—will, on and after the 1st of December, be at No. 55, Parliament Street, Westminster, S.W.

Messrs. Brighton and Venning, of 32, Victoria Street, Westminster, have applied themselves for some time past to the production of piping of cast iron of light section, provided with a lead lining; and, so far as it has been adopted, it is stated to give very satisfactory results.

Messrs. R. Dempster and Sons have completed an extension of the works of the Wirksworth Gas Company. Altogether about £2000 has been spent; the additions comprising retort-settings on the regenerative principle, a steam-engine and boiler, exhauster, four purifiers, a small holder, and house and offices.

The Whessoe Foundry Company, Limited, have just completed additional purifying plant at the Coatbridge Gas-Works. It consists of four boxes 24 feet square, with lifting apparatus, contained in a house 129 feet long and 36 feet broad. It has been carried out in accordance with the plans of Mr. T. Wilson, the Engineer of the Coatbridge Gas Company.

The "Electrician" Printing and Publishing Company, of Salisbury Court, Fleet Street, London, have in preparation the 1897 edition of "*The 'Electrician' Electrical Trades' Directory and Handbook*," and invite all persons engaged in the electrical and allied trades to forward names, occupations, and addresses, which are inserted free of charge. Corrections to existing entries are also requested.


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HYDRAULIC AND GAS ENGINEERS,
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**They have completed Exhausters to the extent of 32,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.**

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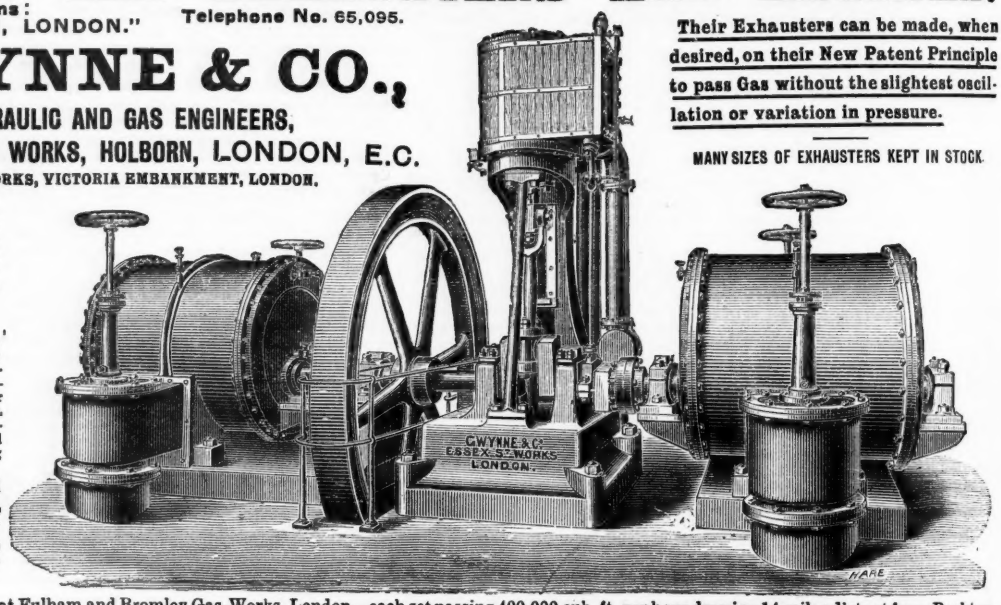


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Exhausting Machinery at Fulham and Bromley Gas-Works, London—each set passing 400,000 cub. ft. per hour drawing 14 miles distant from Beckton.
**Catalogues and Testimonials sent on application.**


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Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS, should be received not later than the FIRST POST on SATURDAY.


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O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.
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[For Illustrated Advertisement see Nov. 3, p. 830.]

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**THE Directors of the Coatbridge Gas** Company invite OFFERS for a set of four PURIFIERS, 16 feet square, with Lifting Apparatus, Centre-Valve, and 15-inch Connections. All in good working order.
Offers to be addressed to T. WILSON, Engineer, Gas-Works, COATBRIDGE.

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**THE British Gaslight Company, Limited,** have FOR SALE at their Etruria Works a STATION METER by Parkinson and Co. Capacity, 30,000 cubic feet per hour, with 12-inch Inlet, Outlet, and Bye-Pass Valves and Connections.
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The Meters can be seen at work, and any further Information obtained, by application to the undersigned, to whom tenders must be sent not later than Nov. 28.
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Gas-Works, Etruria,
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**FOR SALE—**
Two HORIZONTAL ENGINES, by F. Horne, of London, fitted with Air-Pumps, for use with Surface Condenser. Cylinders 13½-inch Bore, and 22-inch Stroke.
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One GASHOLDER 80 feet diameter.
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Three PURIFIERS 12 feet square, with 12-inch Connections.
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One HORIZONTAL ENGINE and EXHAUSTER.
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Contractors to provide Barrels, and accept delivery at Blackhill Station.
Tenders to be sent to the undersigned not later than Dec. 10, 1896.
M. RICHLEY,
Secretary.
Nov. 20, 1896.

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SALE BY TENDER OF £20,000 FIVE PER CENT. DEBENTURE STOCK.
MINIMUM PRICE, £175 PER CENT.
**THE Directors invite Tenders for the** Issue on Sale to the highest Bidders of £20,000 of FIVE PER CENT. PERPETUAL DEBENTURE STOCK, authorized to be raised under the Kent Water-Works Act, 1877.
The Ordinary Capital of the Company raised is £868,000, which comprises £708,000 Capital Stock, on which the Dividend for the last Half Year was at the rate of 10 per cent. per annum, with a further Dividend of 2 per cent. per annum on account of back Dividends, and £160,000 new Capital Stock, on which the full Dividend of 7 per cent has been paid since its issue.
The Mortgage Capital raised is £42,000, and the Debenture Stock raised is £20,000.
Tenders must be sent in on or before Tuesday, the 8th of December.
Forms of Tender, with Particulars and Conditions, may be obtained on application to the Secretary.
Tenders below the minimum price of £175 for each £100 of Stock cannot be accepted.
By order of the Directors,
ALEXANDER DICKSON,
Secretary of the Company.
Kent Water-Works Offices,
Mill Lane, Deptford, S.E.,
Nov. 18, 1896.

CANNEL, COAL, ETC.
**JOHN ROMANS & SON, EDINBURGH,**
Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS and WATER WORKS.
Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / NEWTON GRANGE, NEWBATTLE, DALKEITH, } SCOTLAND.

**GOODSON'S Patent Self-Acting Gas** GOVERNORS and BURNERS.
For Illustrated Advertisement, see "JOURNAL" for Nov. 17, p. 988.
GOODSON AND Co., 213, Vauxhall Bridge Road LONDON, S.W.

**MICHAEL AND WILL'S Law of Gas,** Water, and Electric Lighting. Fourth Edition. Entirely re-written by J. SHIRESS WILL, Esq., Q.C. *Royal 8vo.* 1894. *Price* 32s., *Cloth*; *for Cash, post free*, 26s. 6d. "The Standard book on the subject."—"Local Government Chronicle."
BUTTERWORTH AND Co., 7, Fleet Street, LONDON, E.C.

**COUNTY BOROUGH OF STOCKPORT.**
(GAS DEPARTMENT.)
GASHOLDERS.
**THE Gas Committee are prepared to** receive TENDERS for the TELESCOPING of two GASHOLDERS at their Portwood Works, Stockport.
Drawings and Specifications can be obtained, on and after the 28th inst., by applying to the Engineer, Mr. S. Meunier, on payment of 10s. 6d., which will not be returned.
Tenders, endorsed "Gasholder," must be addressed to the Chairman of the Gas Committee, and delivered not later than 2 p.m., on Thursday, the 3rd of December next ensuing.
The Resolution of the Council that Contractors will be expected to pay the Standard Rate of Wages paid in the district will apply to this contract; and the Committee do not bind themselves to accept the lowest or any tender.
By order,
WALTER HYDE,
Town Clerk.
Stockport, Nov. 20, 1896.

**COUNTY BOROUGH OF STOCKPORT.**
(GAS DEPARTMENT.)
HEATING APPARATUS.
**THE Gas Committee are prepared to** receive TENDERS for the supply and erection complete of a HEATING APPARATUS required for their new Workshops, Portwood, Stockport.
Information and Particulars can be obtained from the Engineer, Mr. S. Meunier, to whom full detailed Plans and Specifications must be sent on or before Nov. 28 next.
Tenders, endorsed "Heating Apparatus," must be addressed to the Chairman of the Gas Committee, and delivered not later than 2 p.m., on Thursday, the 3rd of December next ensuing.
The Resolution of the Council that Contractors will be expected to pay the Standard Rate of Wages paid in the district will apply to this contract; and the Committee do not bind themselves to accept the lowest or any tender.
By order,
WALTER HYDE,
Town Clerk.
Stockport, Nov. 20, 1896.

**SHEFFIELD UNITED GASLIGHT COMPANY.**
PURIFIERS.
TO ENGINEERS, IRONFOUNDERS, &c.
**THE Directors of this Company invite** TENDERS for the supply and erection of Six PURIFIERS, 74 feet by 40 feet, together with internal Fittings, Covers, and Connections complete for the Purifying-House at their Grimesthorpe Station.
Drawings and Specification may be seen, and Bill of Quantities with Form of Tender obtained, on or after the 19th inst., on application to the Engineer, Mr. Fletcher W. Stevenson, on payment of 10s. 6d., which will be returned on receipt of a *bonâ-fide* tender.
Sealed tenders, endorsed "Tender for Purifiers," to be delivered by post to the undersigned at the Company's Offices not later than the first post on Saturday, the 5th day of December.
The Directors do not bind themselves to accept the lowest or any tender.
HANBURY THOMAS,
General Manager.
Commercial Street, Sheffield,
Nov. 14, 1896.

**SHEFFIELD UNITED GASLIGHT COMPANY.**
ELEVATORS AND CONVEYORS.
**THE Directors of this Company invite** designs with TENDERS for the supply and erection of the necessary MACHINERY for discharging Coal from Railway Waggons, and breaking, elevating, and distributing same within the Coal-Stores at their Grimesthorpe Station.
Particulars with Drawings will be supplied on application to the Engineer, Mr. Fletcher W. Stevenson, on payment of 10s. 6d., which will be returned on receipt of a *bonâ-fide* tender.
Sealed tenders, endorsed "Tender for Coal Distributing Machinery," to be delivered by post to the undersigned not later than the first post on Saturday, Dec. 19 next.
The Directors do not bind themselves to accept the lowest or any tender.
HANBURY THOMAS,
General Manager and Secretary
Commercial Street, Sheffield,
Nov. 20, 1896.

ISSUE OF STOCKS AND SHARES BY AUCTION UNDER PARLIAMENTARY POWERS.

**MR. ALFRED RICHARDS** undertakes the issuing by Auction of GAS AND WATER SHARES under Parliamentary Powers.

He also holds MONTHLY SALES of GAS AND WATER SHARES at the Auction Mart, Tokenhouse Yard, E.C.

Terms for the issuing of Capital, and also for offering to auction Gas and Water Shares, and all Particulars relating thereto, may be had of Mr. Alfred Richards.

Offices: 18, FINSBURY CIRCUS, E.C.

---

SALE DEC. 8, 1896.

GUILDFORD GASLIGHT AND COKE COMPANY.

**MR. ALFRED RICHARDS** is instructed by the Directors to SELL BY AUCTION at the Mart, E.C., on Tuesday, Dec. 8, at Two o'clock precisely in lots, £5000 of ORDINARY STOCK in the Guildford Gaslight and Coke Company, ranking for a Standard Dividend of 5 per cent. per annum.

Particulars of the SECRETARY to the Company, at the Offices at GUILDFORD; and of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

---

SALE DEC. 8, 1896.

HAMPTON COURT GAS COMPANY.

**MR. ALFRED RICHARDS** will Sell by AUCTION, at the Mart, Tokenhouse Yard, E.C., on Tuesday, Dec. 8, at Two o'clock, Sixteen £10 fully-paid "A" SHARES and Five £10 fully-paid "B" SHARES in the above Company.

Particulars of the AUCTIONEER, 18, Finsbury Circus, LONDON, E.C.

---

EAST LONDON WATER-WORKS COMPANY.

ISSUE OF £165,000 THREE PER CENT. DEBENTURE STOCK.

MINIMUM PRICE, PAR.

**NOTICE** is Hereby Given, that the Directors are prepared to receive TENDERS for the above ISSUE (being the third portion of the £500,000 Debenture Stock, created under the East London Water-Works Company's Act of 1894), bearing Interest at 3 per cent. per annum, less Income-Tax, and redeemable after the expiration of 25 Years from the date of issue, subject to six months' notice being given by the Company.

Minimum Price, Par.

Tenders must be delivered at the Company's Offices, St. Helen's Place, Bishopsgate, E.C., not later than Eleven a.m., on Thursday, the 10th day of December ensuing.

Particulars and Conditions, together with Form of Tender, may be obtained at the said Offices, or will be forwarded on application.

By order of the Court of Directors,
I. A. CROOKENDEN,
Secretary.

St. Helen's Place, Bishopsgate, E.C.,
Nov. 5, 1896.

---

**PRICE'S COKE & COAL BARROW**

effects a great saving of time, labour, and expense.

For Particulars, Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

*Prices are Reduced.*

---

**HEBBURN MAIN GAS COALS.**

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

**For Prices, f.o.b. Ship or Delivered by Rail, apply to**

**THE WALLSEND & HEBBURN COAL COMPANY, LTD.**
**8 Lombard Street,**
**NEWCASTLE-ON-TYNE.**

**W. RICHARDSON, Fitter.**

---

# THE SILICA FIRE-BRICK COMPANY,

**OUGHTIBRIDGE, near SHEFFIELD,**

MANUFACTURE

## SILICA BLOCKS, BRICKS, AND CEMENT

OF SUPERIOR QUALITY

**FOR GAS-FURNACES.**

Trade Mark: "SILICA."

These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their

GREATER DURABILITY,

Strongly recommended where EXCESSIVE HEATS have to be maintained.

---

**THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED**

*— v —*

**"DE MARE" COMPANY.**

**THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED.**

*— v. —*

**"SUNLIGHT" COMPANY.**

**THE INCANDESCENT GAS-LIGHT COMPANY, LIMITED, HEREBY GIVE NOTICE, as follows:—**

**VALIDITY.** The Company's Patent has been declared VALID ON ALL POINTS after a Fifteen-Day Trial.

**NATURE OF INVENTION.** The Invention was described by Mr. Justice Wills as a "PIONEER INVENTION."

**SCOPE OF PATENT.** The Patent HAS BEEN GIVEN A WIDE CONSTRUCTION; and it was held that the protection given by it was not confined to Mantles manufactured according to the particular prescriptions set out in the Specification.

**SHAPE OF MANTLE.** The Judge held that a Mantle, even if made in a different form or shape (such as the "De Mare" Fringe or Plume), IS STILL AN INFRINGEMENT of the "Welsbach" Patent.

**"DE MARE" JUDGMENT.** Judgment for an INJUNCTION, WITH FULL COSTS, has been given against the "De Mare" Incandescent Gas-Light System.

**"SUNLIGHT" JUDGMENT.** Judgment was given AGAINST the "Sunlight" Incandescent Gas-Lamp Company, Limited, on the question of the VALIDITY OF THE PLAINTIFFS' PATENT.

**"SUNLIGHT" MANTLES.** Last about 100 hours.

**"WELSBACH" MANTLES.** Last about 1000 hours.

"Sunlight" Mantles BURN DOUBLE THE GAS to produce the same candle power as the Incandescent Gas-Light Company's Mantles.

Users of "Sunlight" Mantles are applying to the Incandescent Gas-Light Company to REPLACE THEM BY THEIR OWN MANTLES.

**WARNING.** Users of the Incandescent Gas-Light Company's Mantles upon "Sunlight" Burners ARE INFRINGERS OF THE COMPANY'S PATENT, AND WILL BE AT ONCE PROCEEDED AGAINST.

**COSTS.** Certificates of the Validity of the Company's Patent have been granted both by Mr. Justice Romer and Mr. Justice Wills entitling the Company to Solicitor and Client Costs, which will, IN ALL CASES, BE RIGOROUSLY ENFORCED.

**INFRINGERS.** The Incandescent Gas-Light Company WILL TAKE PROCEEDINGS AGAINST ALL PERSONS INFRINGING THEIR PATENT WHETHER

MAKERS,
WHOLESALE DEALERS,
RETAILERS,
or
USERS.

Users of the Company's Mantles upon Burners not sold by the Company ARE INFRINGERS.

**"LIMITED LICENSE" WARNING.** Judgments have already been obtained against such users from Mr. Justice Chitty, Mr. Justice Stirling, Mr. Justice Kekewich, and Mr. Justice North.

FAITHFULL & OWEN,
11, Victoria Street,
Westminster.

Solicitors to the Incandescent Gas-Light Company, Limited.

*April*, 1896.

---

# HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation.

Yield of Gas Per Ton . . 11,205 Cubic Feet.
Illuminating Power, $16\frac{7}{10}$ Stand. Sperm. Candl.
Coke (of good & pure quality) $13\frac{3}{4}$ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash . . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

---

## SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton . . 10,500 Cubic Feet.
Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . $13\frac{1}{2}$ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash. . . . . 1·34 Per Cent.
Tar. . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor $94\frac{1}{2}$ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COALFIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

**MR. MARK ARCHER,**

**HOLMSIDE AND SOUTH MOOR OFFICES,**
**NEWCASTLE-UPON-TYNE.**

## TROTTER, HAINES, & CORBETT,

**Brettell's Estate**

**FIRE-CLAY & BRICK WORKS,**

**STOURBRIDGE.**

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Proprietors of

BEST GLASSHOUSE POT & CRUCIBLE CLAY.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: R. CULL, 31, OLD BROAD ST., E.C.

## NEWBATTLE CANNEL.

**Highest Results in Gas, & Excellent Coke.**

QUOTATIONS ON APPLICATION TO

**THE LOTHIAN COAL COMPANY,**

LIMITED,

NEWBATTLE COLLIERIES,

**DALKEITH, N.B.**

## LONDONDERRY GAS COALS

FROM THE

**MARQUIS OF LONDONDERRY'S COLLIERIES,**

**COUNTY OF DURHAM.**

Available output up to 5000 tons per day. Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

**S. J. DITCHFIELD,**

**SEAHAM HARBOUR, COUNTY OF DURHAM.**

## BOLDON GAS COALS.

**Worked by THE HARTON COAL CO., LTD.**

**Output about 3000 tons per day.**

ANALYSIS—

| | |
|---|---|
| Yield of Gas per ton . | 10,500 Cubic Feet. |
| Illuminating Power . | 16·9 Candles. |
| Coke . . . . . | 66·7 Coke. |
| Sulphur . . . . . | 0·86 Sulphur. |
| Ash . . . . . | 2·04 Ash. |

**Boldon Gas Coals are supplied under contract to**

The Gaslight and Coke Company, South Metropolitan Gas Company, Commercial Gas Company, Imperial Continental Gas Association, European Gas Company, L'Union des Gaz (the Continental Union Gas Company), Crystal Palace District Gas Company, Danish Gas Company, Bombay Gas Company, San Paulo Gas Company, Alliance and Dublin Consumers' Gas Company, Ipswich Gaslight Company, Newcastle Gas Company, Sunderland Gas Company, South Shields Gas Company, and to many other Companies at Home and Abroad.

**For Prices, &c., apply to the**

**HARTON COAL COMPANY,**

LIMITED,

**Newcastle-on-Tyne.**

W. H. PARKINSON,

FITTER.

## THE "COOMBE" DRAUGHT SCREEN FOR INCANDESCENT BURNERS.

For Illustration and Statement of Advantages to be gained by its use, see "JOURNAL," Nov. 3, p. 830.

**ALFRED ARCULUS & CO.,** Glass Manufacturers,

**BIRMINGHAM.**

## JAMES OAKES & Co.,

**ALFRETON IRON-WORKS, DERBYSHIRE,**

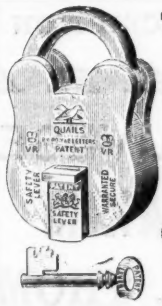
AND

**Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,**

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1½ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.



The Cheapest House in the Trade for

**LEVER LOCKS**

FOR

**GAS-METERS.**

**Joseph Oakley & Co.**

Excelsior Works,

WILLENHALL.

## THORNLEY GAS COALS

WORKED BY THE

**WEARDALE IRON & COAL Co., Ld.**

OUT OF THEIR

THORNLEY AND WHEATLEY HILL COLLIERIES.

**Analysis made by**

**Messrs. J. & H. S. PATTINSON,** *May 28, 1895.*

| | |
|---|---|
| Yield of Gas per Ton . | 10,500 Cub. Ft. |
| Illuminating Power . | 16·9 Candles. |
| Coke (of good quality) . | 67·5 per Cent. |
| Sulphur . . . . . | 0·58 ,, |
| Ash . . . . . | 2·73 ,, |

**For Price, &c., apply to the**

**WEARDALE IRON & COAL Co., Ld.**

**QUAYSIDE, NEWCASTLE-ON-TYNE.**

## THE DRUM

**FOR PUMPING AIR, WATER, SEMI-FLUIDS, &c.**

See Advertisement in last and next issue.

## UNEQUALLED.

**Gas Companies are solicited to try Samples of the**

## MIRFIELD

**BLACK BED GAS COAL.**

*Prices and Analysis on application.*

**MIRFIELD (GAS-COAL) COLLIERY COMPY.**

**RAVENSTHORPE, NEAR DEWSBURY.**

## THOMAS TURTON AND SONS, LIMITED,

**SHEAF WORKS, SHEFFIELD,**

*MANUFACTURERS OF*

**FILES OF BEST QUALITY**

**FOR ENGINEERS.**

**STEEL OF ALL DESCRIPTIONS.**

SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

LONDON OFFICE:

**90, CANNON STREET, E.C.**

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

**CANNEL & COAL.**

**TYNE**

## BOGHEAD CANNEL.

| | |
|---|---|
| Yield of Gas per ton . . . . . | 13,155 cub. ft. |
| Illuminating Power . . . . . | 38·22 candles. |
| Coke per ton . . . . . | 1,301·88 lbs. |

## EAST PONTOP GAS COAL.

| | |
|---|---|
| Yield of Gas per ton . . . . . | 10,500 cub. ft. |
| Illuminating Power . . . . . | 17·8 candles. |
| Coke . . . . . | 70 per cent. |

## SOUTH PELAW MAIN GAS COAL.

| | |
|---|---|
| Yield of Gas per ton . . . . . | 10,500 cub. ft. |
| Illuminating Power . . . . . | 16·3 candles. |
| Coke . . . . . | 73·1 per cent. |

*For Prices and complete Analysis, apply to*

**THOS. W. DANCE & SONS,**

COAL OWNERS, NEWCASTLE-ON-TYNE;

OR

**E. FOSTER & CO.,**

12, JOHN STREET, ADELPHI, LONDON, W.C.

**Wrought-Iron**

**And Fittings and Accessories.**

## LAMBERT BROS., WALSALL,

MANUFACTURERS OF

WROUGHT-IRON TUBES & FITTINGS for GAS, WATER, & STEAM,

BRASS GAS-FITTINGS, GAS-VALVES, STEAM & WATER VALVES, TOOLS, &c., AND OF WARNER'S PATENT MARKET GAS STAND-PIPE.

**LONDON: LAMBETH BRASS & IRON CO., Ltd., Short St., LAMBETH.**

# WILLEY & CO.

## GAS ENGINEERS,

## LONDON & EXETER.

**Offices: HAVEN ROAD, EXETER.**

MANUFACTURERS OF

**GASHOLDERS, ROOFS, BRIDGES, GIRDERS,**

AND EVERY DESCRIPTION OF

**GAS APPARATUS.**

MAKERS OF THE LIVESEY WASHER.

**AGENTS FOR THE MAXIM CARBURETTOR.**

**Engineering Works: ST. THOMAS, EXETER.**

**Manufacturers of WET and DRY GAS-METERS of unsurpassed excellence.**

Patent Penny-in-the-Slot AUTOMATIC METER with the latest improvements. Fraud Proof, Perfect in Action, Accurate in Registration, Instantaneous Price Adjustment *in situ* without Change Wheels.

**Meter Factories: JAMES STREET, EXETER, and 248, KINGSLAND ROAD, LONDON, N.**

**Metropolitan Agent:**

**FRANK ACLAND, M.Inst.M.E., M.Inst.C.E., 70, Cheapside, E.C.**

MANUFACTURERS OF

**GAS-FITTINGS**

IN ENDLESS VARIETY.

**CHANDELIERS, BRACKETS, PENDANTS, MAIN COCKS, &c., &c., &c.**

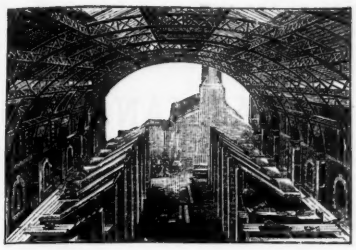
SPECIAL FITTINGS FOR THE AUTOMATIC BUSINESS.

**Brass Foundries and Works: ST. THOMAS, EXETER.**

Telegraphic Address: "WILLEY, EXETER." Telephone 132. Established over 30 Years.

# W. C. HOLMES & CO.

IRONFOUNDERS AND CONTRACTORS.

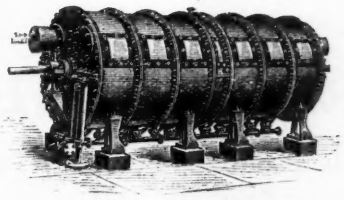


Makers of
GAS & CHEMICAL
PLANT.

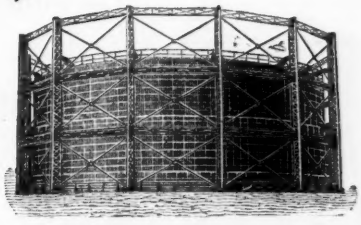
Telegrams:
"HOLMES, HUDDERSFIELD."

Improved
PATENT SCRUBBER-WASHERS,
All sizes,
From 50,000 to 5,000,000 Cubic Feet of Gas per day.
Results unrivalled. Send for Particulars and Prices.

MALLEABLE
and all Kinds of
CASTINGS.



GASHOLDERS of Improved Construction and of all Sizes.
ROOFS, BRIDGES, TANKS, GIRDERS.

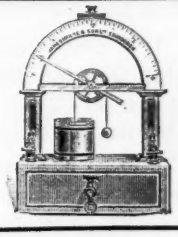


Improved
BYE-PASS and
CENTRE-VALVES,
GOVERNORS,
and METERS.

Rotary or Pump
EXHAUSTERS.

80, CANNON STREET, LONDON,
AND
## WHITESTONE IRON WORKS, HUDDERSFIELD.

## JAMES MILNE & SON, LTD.,
GAS ENGINEERS,
MILTON HOUSE WORKS, EDINBURGH.
LONDON. — GLASGOW. — LEEDS.



LONDON OFFICE
60, QUEEN VICTORIA ST. E.C.

TELEGRAPHIC ADDRESSES
"DRAKESON HALIFAX."
"ECLAIRAGE LONDON."

TELEPHONE No 43.
"HALIFAX EXCHANGE"

GAS ENGINEERS.
CONTRACTORS.
IRONFOUNDERS.

## JONAS DRAKE & SON

SOLE AGENTS FOR
HISLOP'S
PATENT REGENERATIVE FURNACES
—FOR—
ENGLAND, WALES & ABROAD.
RETORT BENCHES ERECTED COMPLETE
WITH OR WITHOUT SPECIAL FURNACES.
RESULTS GUARANTEED.
OVENDEN HALIFAX

RETORT SETTERS.
FURNACE BUILDERS.
ETC. ETC.

Designs and Estimates on Application.

## GASEOUS FIRING A SPECIALTY.

# IMPROVEMENTS IN STREET LIGHTING.

**Highest Efficiency with Greatest Economy.**

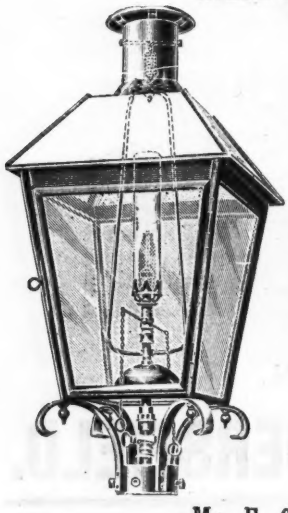
LIGHTING AUTHORITIES, GAS ENGINEERS, and GAS MANAGERS

are invited to inspect the

## INCANDESCENT GAS-LIGHT

**(Welsbach System),**

which has now been successfully adapted to the purposes of

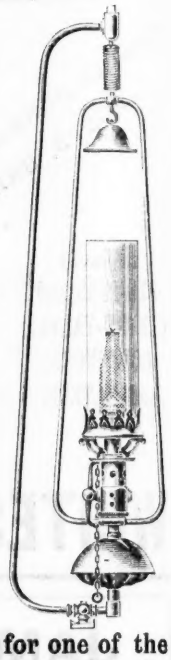


## STREET LIGHTING,

the difficulties caused by VIBRATION having been OVERCOME by the use of the

**NEW SPRING SUSPENSION FRAME (Patent).**

*This System of Lighting meets the requirements of all Lighting Authorities in those Districts where it is desired to effect an Improvement in Street Lighting WITHOUT INCREASE OF EXPENDITURE.*



The following are Extracts from a PAPER read by Mr. F. G. DEXTER, before the SOUTHERN DISTRICT ASSOCIATION.

"The success of the experimental (Welsbach) lighting secured the contract for one of the Parish Council Districts; and this was shortly followed by the contract for three years for the city lamps. The total represents altogether about 500 single lamps, and 15 refuge lamps containing two lights."

"In the matter of maintenance of the street lights, the record is favourable—in fact, more so than the estimate provided. By the test-meter, the average daily consumption works out to 38 cubic feet per light, including bye-pass. The bye-pass consumes with a flame half an inch long, $\frac{1}{5}$ foot per hour. This represents 1000 cubic feet per lamp per annum. The average consumption per light, when in use, works out to 12,900 feet per annum, or about $3\frac{3}{5}$ feet per light per hour. The lighting is continued all the year round, from the average times of one hour after sunset to one hour before sunrise."

"The mantles have worked out to an average of three per lamp per annum; but, bearing in mind the absence of frost last winter, the writer believes that four mantles per light is more likely to represent average conditions."

"In the matter of cleaning, it may be said that the lanterns require less attention than with the ordinary flat-flame burner."

"The number of lights attended to per man averages 85."

"The 'Welsbach' Light is undoubtedly one of the greatest aids to successful competition that the Gas Industry has ever experienced. Its influence, while reducing the relative cost of light, has advanced the consumption of gas all over the country by the increased satisfaction of the existing consumers, and the attraction of others. The writer feels that its influence should not be confined to the house. It is capable of meeting every competitor in the street, from cheap oils to arc lights, in cost and in effect; and it is hoped that the foregoing experience may lead many others to seek its aid and to realize its efficiency."

FOR PRICES AND PARTICULARS, APPLY TO THE

## INCANDESCENT GAS-LIGHT CO., Ltd.,

*Palmer Street, Westminster, London.*

ALEX. C. HUMPHREYS, M.Inst.C.E. A. G. GLASGOW, M.E.

# MESSRS. HUMPHREYS & GLASGOW

Have constructed their EUROPEAN type of

## CARBURETTED WATER-GAS PLANT

At the following Gas-Works:—

| | | | |
|---|---|---|---|
| Copenhagen | 700,000 Cub. Ft. | Brighton | 1,500,000 Cub. Ft. |
| Belfast | 1,700,000 ,, | Preston | 1,500,000 ,, |
| Glasgow | 300,000 ,, | Southport | 750,000 ,, |
| Brussels | 700,000 ,, | Bath | 1,000,000 ,, |
| Liverpool | 3,500,000 ,, | New York | 1,200,000 ,, |
| Tottenham | 750,000 ,, | Newburgh, N.Y. | 350,000 ,, |
| Santiago | 400,000 ,, | Tottenham (Second Contract) | 750,000 ,, |
| Swansea | 750,000 ,, | St. Joseph, Mo. | 750,000 ,, |
| | | Brussels (Second Contract) | 700,000 ,, |

And have now under Contract:—

| | | | |
|---|---|---|---|
| Belfast (Second Contract) | 4,500,000 Cub. Ft. | Stockport | 500,000 Cub. Ft. |
| Shanghai | 225,000 ,, | Norwich | 1,000,000 ,, |
| Winchester | 200,000 ,, | Guildford | 350,000 ,, |
| Hoylake | 125,000 ,, | Syracuse, N.Y. | 850,000 ,, |
| Manchester | 3,000,000 ,, | Bordentown, N.J. | 125,000 ,, |
| Holyoke, Mass. | 600,000 ,, | Lea Bridge | 350,000 ,, |
| Edinburgh | 2,000,000 ,, | Newburgh, N.Y. (Second Contract) | 250,000 ,, |
| Stockton-on-Tees | 500,000 ,, | Coventry | 600,000 ,, |

In addition to which the previous Installations of The Gaslight and Coke Company under this System have a total capacity of 10,000,000 cubic feet per diem.

*9, Victoria Street, London, S.W.* Telegrams: "EPISTOLARY, LONDON." *United States Office, 64, Broadway, New York.*

[ESTABLISHED 1844.] ORIGINAL MAKERS. [ESTABLISHED 1844.]

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THE SIX MEDALS AWARDED TO THOMAS GLOVER'S PATENT DRY GAS-METERS;

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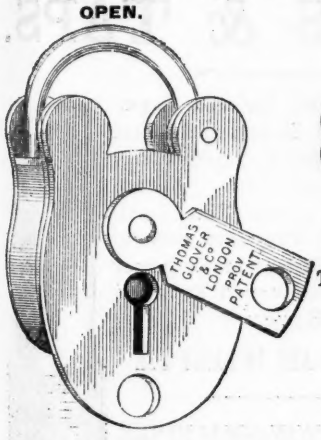


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Prevents Tampering with the

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The Padlock is Sealed by means of a Lead Eyelet, which is impressed with Company's private mark. Eyelets easily fixed and removed by Company's Collector.

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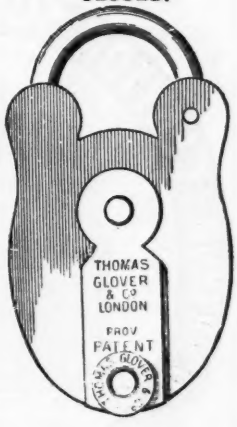


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DRY GAS-METER MANUFACTURERS,

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## Victory over Welsbach Incandescent Light.

*For our first-class Burners at 10d.* } WARRANTED, IN WRITING, TO
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ALL ARTICLES FOR INCANDESCENT LIGHT GOOD & CHEAP.

**Send for Price Lists.**

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## STOURBRIDGE RETORTS AND FIRE-BRICKS.

BEST QUALITY.

KING BROTHERS, STOURBRIDGE.

[See Illustrated Advertisement, Nov. 3, p. 880.]

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## OXIDE OF IRON.

NATURAL BOG ORE FROM OWN MINES.

Samples and Prices on application.

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Gas-Bags for Mains. High Water-Boots. Woollen Miners' Jackets.

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*Write for Price List to*

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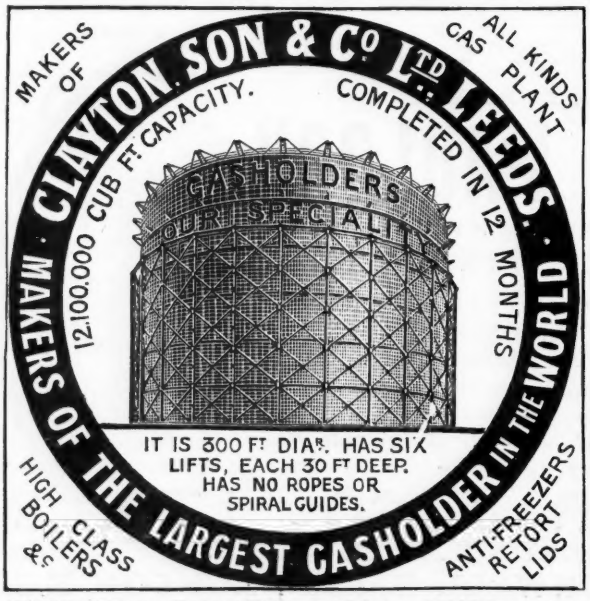
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CLAYTON, SON & Co LTD LEEDS
ALL KINDS GAS PLANT
12,100,000 CUB FT CAPACITY.
COMPLETED IN 12 MONTHS
GASHOLDERS
OUR SPECIALITY
IT IS 300 FT DIAM. HAS SIX LIFTS, EACH 30 FT DEEP. HAS NO ROPES OR SPIRAL GUIDES.
MAKERS OF THE LARGEST GASHOLDER IN THE WORLD
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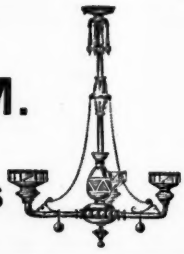

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GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station, or for Export, all kinds of Fuel for Gas purposes.

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These **Patent Twisted Taper Rymers and Taps** are the best ever made for Gas and Water Service Connections. A true Hole and a correct Thread can be assured. They are easy to work, and will last much longer than straight grooved Taps and Rymers.

THOUSANDS ARE IN DAILY USE.

**Also SCREWING-MACHINES, STOCKS and DIES (with Patent Twisted Dies), PIPE-TONGS, and other TOOLS.**

Apply for Prices and Particulars to

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## Sulphate of Ammonia Apparatus.

**The most successful and approved Apparatus known up to the present time.**

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**The Apparatus has been supplied to the following Firms—**

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| HALIFAX. | MARKET HARBRO' | CHESTER. |
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| ST. ALBANS. | LEICESTER. | IPSWICH. |
| DUKINFIELD. | DARWEN. | BOURNEMOUTH. |
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CHARGING OR COAL MEASURING TRUCKS.

FOUR CENTRE SIDE TIP WAGGON.

**SPECIALITIES—**

**LYON & DEIGHTON'S PATENT SCOOP FILLING WAGGONS,**

Steel Coal and Coke Barrows, Steel Charging or Coal Measuring Waggons, Railways, Points, and Crossings, Patent Turntables (requiring no Lubrication), Charging Scoops, Rake-Heads, Revolving Screens, Hoppers, &c., Cast-Iron Smith's Hearths, Steel Side Tipping Waggon, End Tip Waggons, or Universal Tip Waggons, Lyon's Patent "Cradle" Side, End, or Universal Tip Waggons for easily working heavy loads.

**C. W. LYON, Engineer, Thornhill-Lees, Dewsbury.**

# ARROL-FOULIS

**Patent Automatic Machinery**

FOR

# DRAWING AND CHARGING GAS-RETORTS.

**Full Particulars may be obtained from the Sole Makers,**

## SIR WILLIAM ARROL & CO., Limited,

**GLASGOW.**

[See Illustrated Advertisement, Nov. 3, p. 831.]

**PELOUZE & AUDOUIN'S**

# PATENT MECHANICAL CONDENSER.

**Over 292,000,000 Cubic Feet of Gas per Day is passing through about 550 of these Machines.**

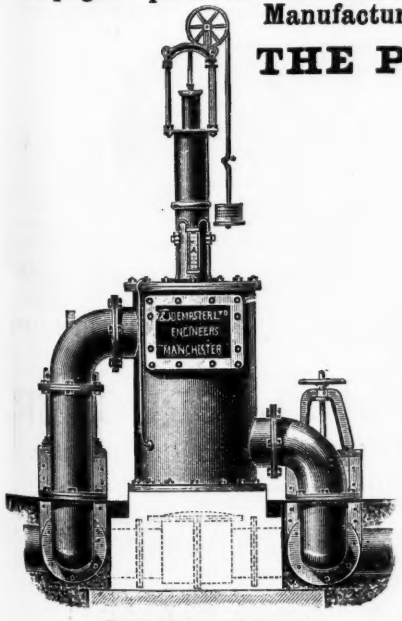
## Messrs. R. & J. DEMPSTER, Limited,

HAVE PLEASURE IN ANNOUNCING THAT THEY HAVE MADE ARRANGEMENTS WITH THE

**Compagnie pour la Fabrication des Compteurs et Materiel d'Usines a Gaz, of Paris, to Manufacture and Sell in this Country and the Colonies,**

## THE PELOUZE & AUDOUIN CONDENSER,

According to P. AUDOUIN'S LATEST PATENTS.




FRONT ELEVATION.

This Apparatus is in very general use in most of the Gas-Works on the Continent and in America; over **550** being in use in different parts of the World for condensing and arresting all Tar Particles and Vapours from the Gases from Coal, Oil, and Wood.

The large number in use is sufficient proof of its utility. By the almost complete elimination of Tar, which is effected to the extent of 99·7 per cent., it facilitates Purification in the Purifiers, by preventing the clogging or obstruction of the Purifying Materials, which, in consequence, last much longer; thus effecting a Saving both in Materials and Labour.

So effective is this Apparatus that a piece of white paper placed over a Test-Tap on the Inlet of the Machine is immediately covered with Tar, whilst on the Outlet the white paper remains perfectly clean.

The Machines are made in the following sizes, for Works producing per 24 hours—

| | Cubic Feet. | | Cubic Feet. |
|---|---|---|---|
| 0 | 35,000 | 5 | 500,000 |
| 1 | 70,000 | 6 | 700,000 |
| 2 | 140,000 | 7 | 1,240,000 |
| 3 | 210,000 | 8 | 1,750,000 |
| 4 | 350,000 | For larger Makes, two Machines are recommended. | |

**For Prices and further Particulars, apply to the Sole Makers—**

Telegraphic Address: "SCRUBBER, MANCHESTER." **R. & J. Dempster, Ld., Gas Plant Works, Newton Heath, Manchester.** Nat. Telephone Nos. 2296 & 34.

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## LIGHT-DIFFUSING GLOBE.

**Guaranteed to give more Light, with better Diffusion, than any Globe in existence.**

LATEST DESIGN IN CLEAR GLASS AND NEW PATENT ROSE TINT.

**PRICE LIST IN NEW PATENT ROSE TINT.**

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| No. 1 . . . | 54s. per doz. |
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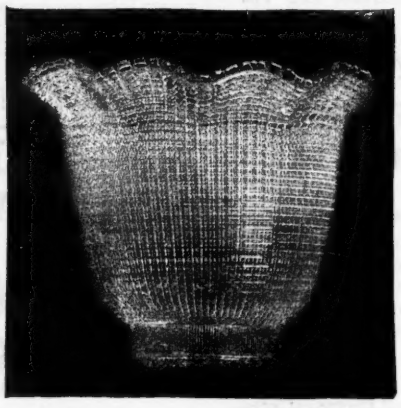

**PRICE LIST IN NEW PATENT ROSE TINT.**

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| „ 10 . . . | 63s. „ |
| „ 12 (Brass Mounted) | 10s. each. |
| „ 13 . . . | 36s. per doz. |
| „ 14 . . . | 63s. „ |
| „ 10/10 . . | 63s. „ |

No. 10/10 in Clear Glass, **3s. 6d.** each. In Patent Rose Tinted Glass, **5s. 3d.** each.

**We have pleasure in submitting our New Pattern "Holophane" No. 10/10 for the Incandescent Light. The graceful Design of this Globe, together with its high efficiency, should gain for it a very extensive use.**

We beg further to advise that we are now prepared to supply all our different Patterns in an exceedingly beautiful Rose Tint. The Combination of this Tint with the well-known Diffusing Qualities of our "Holophane" System produces a warm, equal, and pleasing illumination, without the great loss of light that results from the use of other tinted Globes. Our Rose Tint entirely overcomes the disadvantages alleged against the Incandescent Gas-Light.

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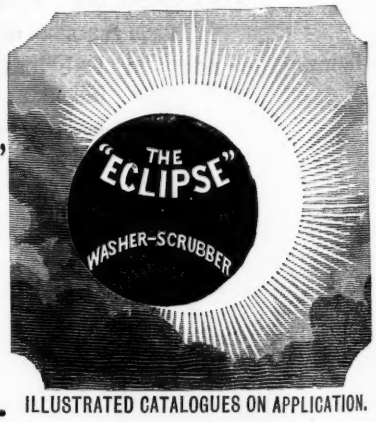
Wellington, Nelson, and Market Street Works,

**KEIGHLEY, Yorks.**

RETORT-FITTINGS,
CONDENSERS,
PURIFIERS, WITH PLANED JOINTS.

GASHOLDER TANKS,
COLUMNS, GIRDERS,
LAMP-POSTS,

**And all Kinds of Gas-Making Apparatus and General Ironwork.**

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## Laycock & Claphams' Patent "ECLIPSE" WASHER-SCRUBBER,

Which is efficiently dealing with a total of **85,600,000** Cubic Feet of Gas per day.

**Repeat Orders speak for themselves, some of which are given below—**

| | | CAPACITY, CUB. FT. |
|---|---|---|
| Sheffield United Gas Company | 2 Machines | 1,500,000 each. |
| Do. do. | 2 „ | 4,000,000 „ |
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| Keighley Corporation . . | 2 „ | 1,000,000 „ |

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| Manchester Corporation. . | 2 Machines | 4,000,000 each. |
| Do. do. . . | 1 Machine | 3,000,000 |
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